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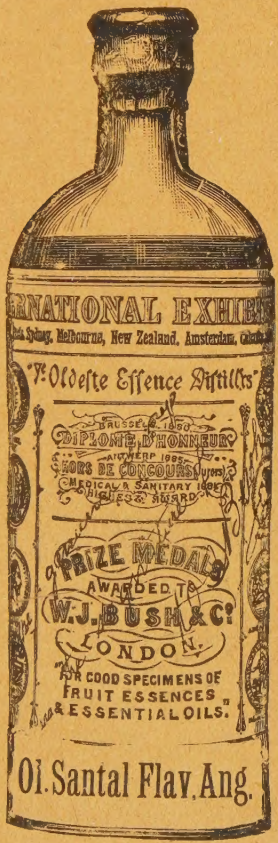

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FROM JULY 1, 1905, TO JUNE 30, 1906,

WITH THE

TRANSACTIONS

OF THE

BRITISH PHARMACEUTICAL CONFERENCE

AT THE

FORTY-THIRD ANNUAL MEETING

HELD IN

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JULY, 1906

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(*a*) To bring under the notice of pharmacists, principals, and their assistants, in their districts, who are unassociated with the Conference, the advantage of membership with it, and by personal effort to try and induce them to join.

(*b*) To assist in stimulating research by asking pharmacists, who have the time, ability, and disposition, to contribute from time to time a paper or useful note to the annual meetings.

(*c*) To endeavour to induce defaulters to continue their membership.

(*d*) To take generally a watchful and sympathetic interest in the affairs of the Conference.

To render those services voluntarily at times convenient to themselves and as opportunity offers.

THE

BRITISH PHARMACEUTICAL CONFERENCE.

AN ORGANIZATION ESTABLISHED IN 1863 FOR THE ENCOURAGEMENT OF PHARMACEUTICAL RESEARCH, AND THE PROMOTION OF FRIENDLY INTERCOURSE AND UNION AMONGST PHARMACISTS.

THE most important ways in which a member can aid the objects of the Conference are by suggesting subjects for investigation, working upon subjects suggested by himself or by others, contributing information tending to throw light on questions relating to adulterations and impurities, or collecting and forwarding specimens whose examination would afford similar information. Personal attendance at the yearly gatherings, or the mere payment of the annual subscription, will also greatly strengthen the hands of the executive.

A list of subjects suggested for research is published early in the year (see page 161). Resulting papers are read at the annual meeting of the members; but new facts that are discovered during an investigation may be at once published by an author at a meeting of a scientific society, or in a scientific journal, or in any other way he may desire; in that case, he is expected to send a short report on the subject to the Conference.

The annual meeting for 1907 will be held at Manchester.

Gentlemen desiring to join the Conference can be nominated at any time on applying to the Secretaries, or any other officer or member. The yearly subscription is payable in advance, on July 1st. The amount, which includes free delivery of the Year-Book, is fixed at a minimum of 7*s.* 6*d.* for members residing within the Postal Union. Further information may be obtained from

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The Conference annually presents to members a volume of 300 to 600 pages, containing the proceedings at the yearly meeting, and an Annual Report on the Progress of Pharmacy, or Year-Book, which includes notices of all pharmaceutical papers, new processes, preparations, and formulæ published throughout the world. The necessary fund for accomplishing this object consists solely of the subscriptions of members. The Executive Committee, therefore, call on every pharmacist—principal, assistant, or pupil—to offer his name for election, and on every member to make an effort to obtain more members. The price of the Year-Book to non-members is ten shillings. The constitution and rules of the Conference, and a convenient form of nomination, will be found at page 166.

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PREFACE

Necessity has arisen to reduce materially the number of pages of the *Year-Book*. In consequence, it has been decided to omit the customary introduction; to materially abridge the chemical abstracts and those relating to pharmacopedics; and to delete the section previously occupied with "Notes and Formulæ."

The abstracts in the chemical section have been made as brief as possible. They have been limited to subjects of direct pharmaceutical interest. Details of processes have, for the most part, been omitted; and, when the matter has already been published in any one of the English journals of pharmacy, little more than a brief reference thereto has been given.

In the section of pharmacy, however, much fuller details and more extended abstracts have been given. Formulæ from English and foreign sources have been included; but these are generally authenticated, either by individual pharmacists or by corporate bodies.

It is hoped that these compulsory changes may not render the *Year-Book*, **1906,** less practically useful as a work of reference than preceding volumes, and that it may still be worthy of a place in the library of the practising pharmacist.

CHEMISTRY

YEAR-BOOK OF PHARMACY

PART I

CHEMISTRY.

Abies alba, Styrian, Essential Oil of the Leaves of. (*Schimmels' Report, May*, **1906**, 57.) The needles yielded 0·56 per cent. of oil. Sp. gr. 0·8852; $a_D - 34° 55'$; acid value, 0·9; ester value 17·5, equivalent to 6·1 per cent. of bornyl acetate. Solubility in alcohol 90 per cent., 1 : 6·5 and more. The same material cut up small before distilling gave an oil containing less sesquiterpene than the above and 7·4 per cent. of bornyl acetate. These Styrian oils have a higher sp. gr. than those obtained from Swiss or Tyrolian *Abies alba*, the sp. gr. of which ranges from 0·869 to 0·875.

Acetone, Quantitative Determination of. A. Jolles. (*Berichte*, **39**, 1306.) The acetone solution is treated with a large excess of standardized $NaHSO_3$ solution, allowed to stand in contact for thirty hours, when the remaining $NaHSO_3$ is titrated back in the usual manner with N/10 I solution. Each molecule of $NaHSO_3$ used up is equivalent to a molecule of C_3H_6O.

Achillea nobilis, Essential Oil of. P. Echtermeyer. (*Archiv der Pharm.*, **243**, 238.) The oil distilled from the flowering plant is greenish yellow, with a camphoraceous odour and a bitter taste; sp. gr. 0·9353 at 15°C.; $a_D - 10° 41'$; saponification value 103·6. It contains borneol, acetic and formic acids as esters, camphene, and a polyterpene $C_{15}H_{24}$.

Aconite Root, Alkaloidal Assay of. (*Caesar and Loretz's Report, September*, **1905**, 101). Seven Gm. of the powdered root is macerated

for 30 minutes in a closed flask with 70 Gm. of ether and 5 Gm. of NaOH solution 15 per cent., the mixture being frequently shaken. The ether layer is then run through a pad of cotton wool and set aside until clear. Fifty Gm., or an aliquot part, of the clear liquid, 10 Gm. of which = 1 Gm. of root, is then weighed off and shaken out with 15, 10, and 10 c.c., in succession, of 1 per cent. HCl solution. The acid extracts are filtered into a separator, made alkaline with AmOH, and shaken out with 15, 10, and 10 c.c. of $CHCl_3$. These $CHCl_3$ extracts are filtered into a small tared flask, the solvent is distilled off, and the residue redissolved twice in 5 c.c. of ether, each lot being driven off separately, after which the residue is dried over H_2SO_4 and weighed. For the volumetric determination of the alkaloid in the weighed residue, it is dissolved in absolute alcohol, treated with 20 c.c. of water, and titrated with N/10 HCl solution with hæmatoxylin indicator. Each c.c. of N/10 acid used up is equivalent to 0·0645 Gm. of aconitine.

Aconite Root, Variability of, in Alkaloidal Strength. Chevalier and Barelet. (*Bull. gen. de Therap.*, **150,** 713.) The average amount of total alkaloids found in aconite root of Continental commerce is from 0·2 to 0·5 per cent. Chevalier records that a specimen of the root from North America yielded 0·378 per cent. of crystalline "aconitine" and 0·578 per cent. of amorphous alkaloid; the latter had the optical properties of japaconitine. Galenical preparations of this root would therefore contain twice as much active constituents as those from root of the ordinary alkaloidal strength. Barelet has also noted the marked variation in physiological strength of aconite roots derived from different districts, and states that the plant grown in the Zinal Valley is much more toxic than that derived from the Vosges.

Aconitum chasmanthum, Indaconitine from. W. R. Dunstan and A. E. Andrews. (*Proc. Chem. Soc.*, **21,** 233.) *Aconitum chasmanthum*, known as "mohri," was at first considered to be identical with *A. napellus*, but is now recognized as being a distinct species. It yields the highly toxic crystalline base indaconitine $C_{37}H_{47}O_{10}N$ allied to, but differing from, aconitine. It closely resembles aconitine and pseudaconitine in physiological action. It is hydrolyzed in two stages, in the first of which acetic acid and indbenzaconine $C_{32}H_{45}O_9N$ are

formed. The latter is practically non-toxic. Indaconitine is intermediate in its properties between aconitine and pseudaconitine of Nepal aconite. The authors now adopt the formula $C_{36}H_{51}O_{12}N$ for the latter.

Aconitum spicatum, Bikhaconitine from. W. R. Dunstan and A. E. Andrews. (*Proc. Chem. Soc.*, **21**, 234.) Bikhaconitine $C_{36}H_{51}O_{11}N$ from *Aconitum spicatum* is more toxic than aconitine, but slightly less so than pseudaconitine. The base does not crystallize so easily as the other aconitines, but it furnishes crystalline salts. Hydrolysis of the base takes place in two stages, in the first of which acetic acid and a new base veratroyl-bikhaconitine are formed. The latter is amorphous, but forms crystalline salts ; on further hydrolysis the latter forms veratric acid and bikhaconine ; the latter is also amorphous, and its salts are crystalline.

Aethusa cynapium, Constituents of. F. B. Power and F. Tutin. (*Internat. Cong. Chem. and Pharm., Liége*, through *Journ. Chem. Soc. Ind.*, **24**, 938.) A minute trace of volatile alkaloid, having the characters of conine, was isolated ; the yield of hydrochloride being 0·0003 per cent. of the fresh plant, equivalent to 0·00023 per cent. of conine. It is possible that under certain conditions the amount of alkaloid is greater, thus accounting for the popular attribute of poisonous properties to the plant. The base isolated had the physiological action of conine. In addition to this, the following constituents were isolated ; a small amount of unpleasant smelling essential oil ; formic acid ; resinous matter, containing pentatriacontane $C_{35}H_{72}$, and a crystalline alcohol, either phytosterol or a lower homologue thereof ; with formic, butyric, proto-catechuic acids, when the resin insoluble in petroleum ether is fused with alkali. Dimannitol and inactive glucose were present in the non-resinous portion.

Alcohol free from Aldehyde for the Preparation of Alcoholic Potash Solution. F. L. Dunlap. (*J. Amer. Chem. Soc.*, **38**, 395.) Silver nitrate 1·5 Gm. is dissolved in water, 3 c.c. This solution is added to alcohol 1000 c.c. in a stoppered flask, and agitated. Meanwhile KOH 3 Gm. is dissolved in 10 to 15 c.c. of boiling alcohol, and added to the alcoholic silver solution without shaking. The mixture is set aside until the black,

finely-divided precipitate of Ag_2O has subsided, from which it is decanted, filtered, if necessary, and distilled. None of the distillate which does not give a colour with KOH need be rejected. The alcohol thus obtained is perfectly neutral and gives solution with KOH devoid of colour. It is specially useful for the preparation of standard alcoholic KOH solution for quantitative saponifications.

Alkaloids, New Reagents for Microchemical Detection of. M. Herder. (*Archiv der. Pharm.*, **244**, 120.) Calcium mercuric iodide and barium mercuric iodide dissolved in 40 per cent. solution of chloral hydrate are employed for the microchemical detection of alkaloids in plant sections. The precipitates formed with the various alkaloids are stated to be crystalline and distinctive, and the reagents, especially the barium compound, are very sensitive. A section of the material should be washed out with 5 per cent. alcoholic solution of tartaric acid, and its behaviour with the reagents compared with that of a normal alkaloid-containing section.

Allyl and Propenyl Compounds, Differentiation of, by Means of Mercuric Acetate. L. Balbiano. (*Reale Accad. dei Lincei*, through *Journ. Pharm. Chim.* [6], **22**, 395. Bodies such as methyl-chavicol, safrol, methyl-eugenol, and apiol, which contain an allyl side chain and have the generic formula $R.CH_2.CH:CH_2$ may be distinguished from those with a propenyl chain, $R.CH:CH.CH_3$, such as anethol, iso-safrol, iso-methyleugenol and iso-apiol, by means of their different behaviour with saturated aqueous solution of mercuric acetate. The former give additive mercury-compounds, from which the original body may be regenerated by treatment with H_2S. The latter are decomposed and oxidized.

Thus when *safrol* 10 Gm. is agitated with 100 Gm. of 20 per cent. mercuric acetate solution, the safrol is gradually converted into a dense syrupy liquid which falls to the bottom of the vessel. After 8 days' contact, the oily deposit is washed with water and dissolved in alcohol. On adding 10 or 12 volumes of anhydrous ether, a trace of a solid insoluble substance is precipitated and filtered out. On distilling the filtrate, the oily residue left has the composition $CH_2O_2C_6H_3C_6H_5(OH)HgC_2H_3O_2$ which regenerates safrol when treated with H_2S.

Anethol, thus treated, is rapidly oxidized; mercurous acetate

is at first formed, in 15 to 20 days this is further reduced to metallic mercury. On extracting the mass with ether, washing the ethereal solution with Na_2CO_3, and distilling off the solvent, the glycol $CH_3O.C_6H_4.CHOH.COHH.CH_3$ is obtained.

Aloes, Valuation of. J. van Itallie. (*Apoth. Zeit.*, **20,** 641.) The author thus modifies the method of Tschirch and Hoffbauer (*Year-Book*, **1905,** 19). Five Gm. of the powdered aloes is heated in a flask with 5 c.c. of methylic alcohol, until a perfectly homogeneous mixture is obtained. The temperature is then allowed to fall to about 60°C. when 30 c.c. of $CHCl_3$ is added gradually and the mixture is agitated for 5 minutes. After allowing to stand, the perfectly clear solution is decanted, and the residue left in the flask is heated on the water-bath until all the $CHCl_3$ has been driven off. The residue is again dissolved in methylic alcohol, and treated as before, with chloroform; after decantation the process is repeated a third time. The three $CHCl_3$ solutions are bulked, distilled and the residue weighed when constant at 100°C. Treated thus, the amount of chloroform-soluble matter was found to be as follows with different samples of aloes. Cape, 82 and 56·2 per cent.; Curaçao, 86·4, 88·6, and 78·3 per cent.; Aruba, 61·8 per cent. From this it appears that Curaçao aloes may be equal to Cape.

Antimony Tartrate, New. J. Bougault. (*Journ. Pharm. Chim.* [6], **23,** 321.) Guntz has described a crystalline antimonious tartrate $C_4H_5SbO_7$, which was obtained by treating antimonious oxide with an excess aqueous solution of tartaric acid, and evaporating to dryness. The excess of acid was then removed by treatment with alcohol. The author finds that, although the residue thus obtained has the formula attributed to it by Guntz, it is not a simple body, but a mixture of the antimonious tartrate $C_4H_3SbO_6$ and the ester $C_4H_2.C_2H_5.SbO_6$; the latter being formed from the ethyl alcohol employed. By using acetone instead of alcohol in the process, the formation of this ester is avoided, and the crystalline residue, occurring in small shuttle-shaped scales, often grouped in rosettes, has the formula $C_4H_3SbO_6$. This is sparingly and slowly soluble in water to the extent of 1 : 125; its solution is very acid, stable on boiling, and has the $\alpha_D + 167°C$. If insufficient water be added to dissolve the compound, it is dissociated. When treated with the theoretical amount of $KHCO_3$ it forms tartar emetic,

the solution of which does not precipitate on heating. The compound dissolves in solution of $NaC_2H_3O_2$, the solution not becoming turbid on heating. The ethyl ester, above mentioned, gives a precipitate on boiling both with $KHCO_3$ and $NaC_2H_3O_2$.

Aristol, [Iodothymol,] Determination of Iodine in. H. Cormimbœuf. (*Annales de Chim. Analyt.*, **10,** 453.) A weighed quantity of the aristol is intimately mixed with six times its weight of pure anhydrous Na_2CO_3 and fused until all organic matter is burnt off. The residue is dissolved in warm water and filtered; the filtrate is treated with half its volume of AmOH, the iodine precipitated by means of $AgNO_3$ and collected and weighed in the usual manner. The amount of chlorine present as impurity may be determined by acidifying the filtrate from the AgI with HNO_3 when AgCl is precipitated, which may be collected and weighed.

Arnica Flowers, Arnidiol from. T. Klobb. (*Bull. Soc. Chim.* [3], **33,** 1075. Further examination of arnisterin (*Year-Book*, **1904,** 27) shows that it differs from the hitherto known phytosterins by the presence of two HO groups; the name is therefore changed to arnidiol. Further examination of the so-called arnicin shows that it consists of esters of arnidiol which are not readily saponified by ordinary alcoholic potash, but when heated for four hours in alcoholic solution of sodium ethylate it yields a large amount of arnidiol. Arnidiol forms a diacetyl compound $C_{28}H_{41}O_2(C_2H_3O_2)_2$ or $C_{29}H_{46}O_2(C_2H_3O_2)_2$ crystallizing from alcohol in two forms, as large octohedra, or in needles and prisms. It also forms a dibenzoyl compound $C_{28}H_{44}O_2(C_7H_5O_2)_2$ or $C_{29}H_{46}O_2(C_7H_5O_2)_2$ crystallizing with difficulty, m.p. 223 225°C. Consequently the formula for arnidiol is either $C_{28}H_{44}\begin{matrix}OH\\OH\end{matrix}$ or $C_{29}H_{46}\begin{matrix}OH\\OH\end{matrix}$

Arsenic, Gutzeit's Test for, an Effective Method of Applying. C. A. Hill and H. S. Collins. (*Chem. and Drugg.*, **77,** 548.) A simple and efficient apparatus is figured and described, and practical details of modifications of the process are given.

Arsenic, Presence of, in So-called "Pure" Glycerins. J. Galimard and E. Verdier. *Journ. Pharm. Chim.* [6], **23,** 183.) Glycerin which gives no reaction for arsenic by

Marsh's and other direct tests is not necessarily free from contamination with that impurity. Specimens which have given no indication of its presence by the ordinary tests, when diluted with twice their volume of 1 per cent. H_2SO_4 and boiled for six hours under a reflux condenser, were then found to give a characteristic arsenical ring when tested. The arsenic probably exists as an intimate organic combination, which must be split up as indicated, before its presence can be proved. It has been found, so far, in all the so-called "pure" glycerins examined.

Arsenic Trioxide, Rapid Method for the Determination of. C. E. Caspari and L. R. A. Suppan. (*Proc. Amer. Pharm. Assoc.*, **1905**, 320.) The arsenic trioxide is dissolved in dilute solution of NaOH by the aid of heat: the solution is then cooled, neutralized with N H_2SO_4 solution treated with excess of saturated solution of $NaHCO_3$, then titrated in the usual manner with N/10 iodine solution.

Alternative methods are to dissolve the arsenic in dilute HCl with heat, but without boiling; adding a slight excess of NaOH, then neutralizing with N/H_2SO_4 adding an excess of saturated $NaHCO_3$ solution and titrating with iodine. Or solution may be effected in saturated sodium bicarbonate solution by boiling, any Na_2CO_3 being converted into $NaHCO_3$ by N/H_2SO_4 and the process continued as above. For expedition and convenience the first method is preferred.

Artemisia frigida, A. leudoviciana and A. caudata, Essential Oils of. F. Rabak. (*Pharm. Review*, **23**, 128.) *Artemisia frigida* gave 0·4 per cent. of oil from the fresh plant and but 0·07 per cent. from the dry. The former was slightly greenish, sp. gr. 0·927 at 22°C.; α_D −24° 48′; acid value, 1·2; ester value, 31·8. The latter oil was darker; sp. gr. 0·930 at 22°C.; α_D −24° 48′; acid value, 4·7; ester value, 40·0. This oil probably contains cineol; it gives a solid compound with H_3PO_4. *A. leudoviciana* gave 0·38 of yellowish green volatile oil, sp. gr. 0·929 at 22°C.; α_D −16° 14′; acid value, 4; ester value, 10. *A. caudata*, 0·24 per cent. of oil with a pleasant odour, probably due to the presence of methyl-chavicol or of anethol; sp. gr. 0·920 at 22°C.; α_D −12° 30′; acid value, 0; ester value, 17·0.

Ash of Euonymin, Iridin, Leptandrin and Podophyllin. W. B. Cowie and W. Dickson. (*Pharm. Journ.*, **22**, 220.) *Green*

euonymin. A specimen was found to contain 66·29 per cent. of ash. The normal extract had been diluted with kieselguhr.

Alcoholic extract of Euonymus bark prepared by the authors gave 4·56 per cent. of ash.

Iridin was found to contain 10·84 per cent. of ash, the nature of which indicates that crude potash alum was present, probably introduced during manufacture.

Alcoholic extract of Iris versicolor gave 5·55 per cent. of ash.

Leptandrin gave 17·55 per cent. of ash, containing calcium phosphate; another sample, 4·43 per cent. of ash with more Fe_2O_3.

Alcoholic extract of Veronica virginica gave 1·44 per cent. of ash.

Podophyllin gave 1·31 per cent. of ash. [See also *Year-Book*, **1888,** 178.]

Automatic Still Alarm. V. C. Hewlett. (*Pharm. Journ.* [4], **21,** 902.) An ingenious apparatus by which a signal is given when a certain amount of distillate has been collected, is figured and described; it is adapted for spirit distillations in alcoholometric determinations.

Bacilli Spores, Method of Staining. O. Orsáy. (*Apoth. Zeit.*, **21,** 476, after *Centralb. für Bakter.*) The bacteria, on a cover glass, are treated with a few drops of a solution of sodium salicylate and acetic acid (sodium salicylate solution 0·5 per cent., 4 parts; acetic acid 5 per cent., 1 part), the superfluous liquid is drained off, so that after spreading the layer of material it dries quickly in the air. It is then fixed in the ordinary way by passing through a flame. The fixed smear is then treated with Ziehl's carbol-fuchsin stain and warmed over the bunsen, so that the preparation is in contact with the warm stain for about 2 minutes. It is then decolorized with 1 per cent. H_2SO_4 solution until it shows a rose tint, then thoroughly washed with water and counterstained in 1 per cent. methylene blue or malachite green solution for 2 minutes, finally mounted in the usual way. The spores will be stained red and the bacteria blue or green.

Backhousia citriodora, Essential Oil of. J. C. Umney and C. T. Bennett. (*Chem. and Drugg.*, **68,** 738.) The oil is now being produced on the commercial scale. A consignment recently examined contained 94 to 95 per cent. of aldehydes, chiefly citral.

Balata, Composition of. A. Tschirch and E. Scheres-chewski. (*Archiv. der Pharm.*, **243,** 358.) The Balata gutta-percha from Dutch and British Guiana derived from *Mimusops sapota* is found to contain 5·7 per cent. of water soluble matter, consisting of gum, albuminoids and bodies which reduce Fehling's solution; 41·5 per cent. of resinoid matter soluble in alcohol; and 45·3 per cent. of guttapercha soluble in $CHCl_3$. From the alcohol soluble resins two crystalline resins, *a*-balalbane $C_{27}H_{42}O_2$, m.p. 230–231°C., and *β*-balalbane, $C_{27}H_{46}O_2$, m.p. 108–109°C., were separated. The former is more soluble and occurs in greater quantity. No esters of cinnamic acid were found. In addition to these two albanes, the alcohol soluble portion contained a fluavil, balafluavil $C_{10}H_{18}O$. The balagutta soluble in $CHCl_3$ is very readily oxidized; its formula is probably $C_{10}H_{18}$. An albanane, balalbanane $C_{20}H_{32}O$ or $C_{19}H_{32}O$, m.p. 55–56°C. was also present.

Balsam of Tolu, Determination of Acid Number of. (*Roeder's Report*, **1905,** through *Pharm. Zeit.*, **51,** 277.) One Gm. of the balsam is first dissolved in 20 c.c. of $CHCl_3$, then diluted with 150–200 c.c. of neutral alcohol, and titrated with $N/\frac{1}{4}KOH$ solution with phenolphthalein indicator. The number of c.c. of alkali used up $\times 14$ gives the acid value. According to K. Dieterich this should be between 114·8 and 158·6; the Ph. G. IV. states between 112 and 168.

Barium cacodylate, Preparation of. A. Annoni. (*Boll. Chim. Pharm.* through *Journ. Pharm. Chim.* [6], **23,** 300.) Barium cacodylate, widely used for the preparation of alkali cacodylates by double decomposition, is thus prepared. Equal weights of barium hydrate and of cacodylic acid are rubbed down in a mortar, and sufficient Ba2HO solution is added to give a faint alkalinity. The filtrate, after standing a few hours, is exactly neutralized with cacodylic acid, and evaporated *in vacuo*. The residue is heated to 115°C. in the presence of CaO, powdered after cooling in a closed vessel, and preserved in well-closed bottles.

Belladonna, Nux Vomica, and Hyoscyamus Extracts, Alkaloidal Assay of. P. Roeder. (*Pharm. Zeit.*, **51,** 322.) Six Gm. of the extract is weighed off on a piece of smooth paper, and transferred, paper and all, into a 200 c.c. flask. It is then

moistened with 6 c.c. of water and 6 c.c. of strong solution of ammonia and shaken occasionally for half an hour. Exactly 120 Gm. of a mixture of chloroform 3 ; absolute alcohol 1, ether 7, is then added and the whole is shaken occasionally for two hours. After setting aside 100 Gm. of the liquid is decanted into a separator (representing 5 Gm. of the original extract). This is then successively shaken out with 30, 10, 10, 5 and 5 c.c. of 3 per cent. HCl solution. The bulked acid extracts are washed twice with 10 c.c. of $CHCl_3$, then made alkaline with AmOH and shaken out with 5 successive 5 c.c. of $CHCl_3$. The chloroform extracts are evaporated in a tared capsule, dried for 3 hours at 100°C. and weighed.

Belladonna Root, Percentage of Alkaloid in. J. H. Henderson. (*Pharm. Journ.* [4], **21**, 191.) Comparative results of the determination of a series of English and foreign specimens of belladonna root are given.

Benzaldehyde, Determination of Small Quantities of. H. Hérissey. (*Journ. Pharm. Chim.* [6], **23**, 60.) The process is based on the formation of the insoluble phenylhydrazone when benzaldehyde is treated with phenylhydrazine, according to the equation

$$C_6H_5.NH.NH_2 + C_6H_5.COH = C_6H_5.CH:N.NH.C_6H_5 + H_2O$$

196 parts of the phenylhydrazone being therefore equivalent to 106 parts of benzaldehyde. The method is applicable to the determination of the small quantities of benzaldehyde formed by the hydrolysis of certain glucosides. After hydrolysis, the liquid is carefully distilled to obtain the aldehyde in 50 c.c. of distillate : this is then treated with an equal volume of phenylhydrazine solution obtained by dissolving phenylhydrazine 1 c.c., glacial acetic acid 0·5 c.c. in water to make 100 c.c. The mixture is heated on the water-bath for 20 to 30 minutes and then set aside for 24 hours. The crystals formed are collected on a Gooch crucible, washed with a little water, dried *in vacuo* over H_2SO_4, and weighed.

Bismuth, Determination of, as $BiPO_4$. L. Moser. (*Zeits. f. Analyt. Chem.*, **45**, 87.) The bismuth salt is dissolved in the smallest possible quantity of dilute HNO_3, heated to boiling and precipitated with excess of Am_2HPO_4 solution. After standing, the precipitate is collected, washed with hot water, dried, ignited

and weighed as $BiPO_4$. On account of the insolubility of $BiPO_4$ in HNO_3 the method is useful for the determination of Bi in the presence of Cd or Cu, the phosphates of which are very soluble in that acid.

Bitter Almonds, Action of Heat on. G. Verlardi. (*Boll. Chim. Farm.* through *Chem. Centralb.* [1], **1906.**) When whole or cut bitter almonds are heated to 105°C. for two hours, the subsequent liberation of HCN on moistening with water is reduced to a minimum, and if they are exposed above this temperature no trace of prussic acid can be detected in them by aqueous maceration followed by distillation. On adding untreated sweet almonds to the whole bitter almonds, however, traces of HCN were found until the temperatures to which they had been exposed reached 109°C. Whole bitter almonds may be rendered practically free from toxic properties by heating them for 2 hours to 170°C.

Bocconia cordata, Further Investigation of the Alkaloids of. J. O. Schlotterbeck and W. H. Blome. (*Proc. Amer. Pharm. Assoc.*, **1905,** 333.) To separate protopine and β-homochelidonine the mixed alkaloids were first fractionally crystallized as acetates, by means of which the first crops were obtained as pure protopine acetate. The mixed acetates were then converted into sulphate, protopine sulphate being almost insoluble, while β-homochelidonine is readily soluble. The fact that α- and γ-homochelidonine are physical isomers of β-homochelidonine was confirmed. When β-homochelidone is heated in a sealed tube, no individual substance, but a mixture of decomposition products is formed. Similarly when the base was treated with alcoholic iodine under pressure, no evidence of displacement of 4 atoms of hydrogen was obtained. With PCl_5 also no Cl substitution was obtained, merely the hydrochloride of the base being produced; nor were definite acetyl compounds obtained by acetylizing. The ammonium salts of the acids present in the root, gave, when liberated, a body crystallizing from alcohol in microscopic transparent crystals which have not yet been identified. (See also *Year-Books*, **1900,** 131; **1901,** 45.)

Boric Acid, Detection of Traces of. V. Castellana. (*Journ. Pharm. Chim.* [6], **22,** 321, after *Atti. Roy. Acad., Lincei.*)

The substance under examination is mixed with an excess of potassium sulphovinate, heated in a small tube, and the vapours which are given off ignited, when the characteristic green bordered flame of boric acid is obtained, if that acid be present. With milk, after thorough agitation to suspend any calcium borate present, 10 c.c. is evaporated to dryness, and the residue is treated as above. The same test serves to detect certain volatile organic acids, the salts of which when heated with potassium sulphovinate give off the ethyl ester of the acid which may be detected by its characteristic odour.

Bromine, Detection of, in Presence of Large Excess of Iodine. H. Cormimbœuf. (*Annales de Chim. Analyt.*, **10,** 145.) *In iodides and HI.* the solution, if acid, is neutralized, then treated with excess of Fe_2Cl_6 solution, sp. gr. 1·420; the iodine is precipitated and filtered out through a pad of glass wool, the traces remaining in the filtrate being driven off by boiling. The solution is then treated with an excess of NaOH, filtered, and a crystal of $KClO_3$ is added to the colourless filtrate; a little $CHCl_3$ is added, followed by excess of strong H_2SO_4. On shaking, any bromine present will be dissolved in the $CHCl_3$ colouring it more or less yellow.

In free iodine the iodine is converted into ferrous iodide, then treated as above.

Brucine and Strychnine, Separation of, by Means of Nitric Acid. W. C. Reynolds and R. Sutcliffe. (*Journ. Soc. Chem. Ind.*, **25,** 512.) Comparing Gordin's (*Year-Book*, **1903,** 160), Stoeder's (*Year-Book*, **1906,** 38) and Keller's original methods, it is found that the first is preferable. It is thus modified. For a weight of total alkaloid up to 0·4 Gm. the reacting solution should contain at least 7 per cent. of HNO_3. Brucine is totally oxidized in 10 minutes, when the action should be stopped; the temperature of the liquid should not exceed 25°C. Excess of KOH or NaOH should be used to liberate the strychnine and never Na_2CO_3 or AmOH. The HNO_3 should be added in the form of acid of the sp. gr. 1·420 and not more dilute, or it may be necessary to add a trace of a nitrite to start reaction.

Cacao, Chocolate, and other Dietetic Powders, Mechanical Separation of Impurities from. F. Bordas and — Toup-

l a i n. (*Comptes rend.*, **142**, 639.) A series of liquids varying in specific gravity from 1·340 to 1·600 are prepared by mixing of carbon tetrachloride and benzine. The cacao or chocolate in powder, previously deprived of its fat and water-soluble constituents, and dried, is treated with these liquids; the portions which sink or float are collected on separate filters and, if necessary, dried and weighed. By using a centrifugator more rapid results are obtainable. The following data indicate the method to be followed. With the liquid sp. gr. 1·340 arachis nut mare sinks, it floats at 1·345: at 1·400 cacao germs sink, floating at 1·440; pure cacao sinks at 1·440, but rises at 1·500; cacao shells sink at 1·500, but rise at 1·530; potato starch sinks at 1·510, but rises at 1·525. Earthy or mineral colouring matter alone sinks at 1·600. (The method is obviously applicable to other powders. —Ed. *Year-Book*.)

Cacao Butter, Test for. B j o e i k l u n d. (*Roeder's Report*, **1905**, through *Pharm. Zeit.*, **51**, 278.) Five Gm. of the cacao butter is dissolved in 10 Gm. of ether in a corked test tube. If the sample is pure, a clear solution is obtained; if the liquid is cloudy, wax is present. The tube is next immersed in water at 0°C. and the time noted at which a turbidity or separation appears. With pure cacao butter the liquid will remain clear for 10 or 15 minutes, and after it has become cloudy again becomes quite clear when the temperature rises to 19° or 20°C.

Calabar Bean and its Extract, Assay of. H. B e c k u r t s. (*Apoth. Zeit.*, **20**, 670.) *Assay of Beans.* Twenty Gm. of the ground beans is macerated with 120 Gm. of ether and 10 c.c. of $KHCO_3$ solution 10 per cent. for 3 hours with occasional agitation; 90 grm. of the ethereal solution (= 15 Gm. of the beans) is then filtered off and the ether is distilled until its volume is reduced to one half. The concentrated ethereal solution is then transferred to a separator, the distilling flask being washed out with a little more ether, 10 c.c. of petroleum ether is added, and the mixture is shaken out with 10, 5, 5, and 5 c.c. of N/10 HCl solution; the bulked acid washings are then treated in another separator, with 10 c.c. of 10 per cent. $KHCO_3$ and shaken out with 45 Gm. of ether: 30 Gm. of this ethereal solution (= 10 Gm. of beans) is removed, and treated with 10 c.c. of N/100 HCl, 20 c.c. of water and 5 drops of iodoesin solution. After agitation, the remaining free HCl is titrated back, in the

usual manner, with N/100 NaOH solution. Each c.c. of N/100 HCl found to be used up by the bases is equivalent to 0·00275 Gm. of physostigmine. The average percentage found in the drug by this method ranges from 0·082 to 0·084 per cent.

Assay of Extract. Three Gm. of the solid extract is dissolved in a mixture of 5 Gm. of alcohol and 5 Gm. of water ; 75 Gm. of ether is added and 10 c.c. of $KHCO_3$ solution, 10 per cent. After leaving in contact, with occasional agitation, of an hour, 50 Gm. of the ethereal liquid is decanted off (= 2 Gm. of the extract) and shaken out as above with N/10 HCl. The process is then continued as directed above, the final addition of N/100 HCl being made to an aliquot part of the purified ether solution as there indicated. The extracts examined contained from 1·25 to 1·3 per cent. of alkaloids calculated as physostigmine.

Calcium Carbonate, B.P., Impure. F. H. Alcock. *Pharm. Journ.* [4], **21,** 615.) The presence of sodium as an impurity in calcium carbonate is noted. In certain analytical processes the occurrence of this impurity would lead to erroneous results.

Calycanthine. H. M. Gordin. (*Proc. Amer. Pharm. Assoc.*, **1905,** 224.) Continuing the investigation of calycanthine from *Calycanthus glaucus* (*Year-Book*, **1905,** 53), various salts of the base have been examined.

Calycanthine nitrate $C_{11}H_{14}N_2.HNO_3$ occurs in snow-white, hard prisms, sparingly soluble in water, m.p. 208-209°C. It may be boiled in water without changing colour, but in the presence of free mineral acid the solution immediately becomes green.

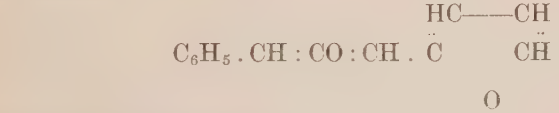
Sulphates. Calycanthine forms two sulphates, one neutral, containing $2\frac{1}{2}$ mols. H_2O ; the other acid, containing 2 mols. H_2O. Both are very soluble in water and extremely hygroscopic. The acid sulphate $C_{11}H_{11}N_2H_2SO_4 + 2H_2O$, m.p. 76°C., but 180° when anhydrous. The neutral salt, $(C_{11}H_{14}N_2)_2H_2SO_4 + 2\frac{1}{2}H_2SO_4$, m.p. 226-227°C. and 229°C. when anhydrous. Both salts crystallize in similar forms as snow white, silky needles with double refraction.

The *chloraurate*, $3(C_{11}H_{14}N_2.HCl.AuCl_3) + 2C_{11}H_{14}N_2.HCl + 2\frac{1}{2}H_2O$; *picrate*, $C_{11}H_{14}N_2.C_6H_2(NO_2)_2.OH + \frac{1}{2}H_2O$; two *oxalates*, $(C_{11}H_{11}N_2)_2H_2C_2O_4$ and $3(C_{11}H_{14}N_2H_2C_2O_4) + C_{11}H_{14}N_2 + 2\frac{1}{2}H_2O$; *calycanthine mercuric chloride*, $(C_{11}H_{14}N_2HCl.)_3.2HgCl_2 + 1\frac{1}{2}H_2O$, were prepared and examined. The two *tartrates* could not be isolated in crystalline form. The

nitrosamine, $C_{11}H_{13}N_2.NO$ melts at 175–176° with decomposition. Calycanthine contains one CH_3 group linked to the nitrogen.

Cardamine amara, Essential Oil of. K. Feist. (*Apoth. Zeit.*, **20,** 832.) The fresh herb, steam distilled, gives an essential oil composed chiefly of secondary butyl iso-sulphocyanate, and is similar to the oil of *Cochlearia officinalis* as described by A. W. Hoffmann.

Carlina acaulis, Essential Oil of. F. W. Semmler. (*Berichte*, **39,** 726.) The oil examined had the sp. gr. 1·0333 at 19°C. $[\alpha]_D$ 1·5696. It contained from 12 to 15 per cent. of calinene, $C_{15}H_{24}$, a monocyclic sesquiterpene, b.p. 139–141°C. at 20 mm. The chief constituent of the oil is "carlina-oxide," $C_{13}H_{10}O$, b.p. 167–168 at 20 mm., sp. gr. 1·066 at 17°C., optically inactive. It yields benzoic acid on oxidation with $KMnO_4$. From the nature of the tetrahydro-product, $C_{13}H_{14}O$, obtained by the action of nascent hydrogen from sodium and alcohol on the oxide the original oxide is probably a furane derivative with the formula



(See *Year-Book*, **1897,** 130.)

Carnauba Wax, Characters of. L. G. Radcliffe. (*Journ. Soc. Chem. Ind.*, **25,** 214.) The wax derived from Ceará had the following characters. M.p. 84°C.; acid value, 2·9; ester value, 85·4; iodine value, by Wijs' method, 13·17. The acid and ester values were determined in solutions of the wax in amylic alcohol.

Cassia grandis. E. W. Mann. (*Pharm. Journ.* [4], **21,** 9.) The peculiar odour of the pods of the horse cassia is due, in part, to a volatile crystalline body of which 0·02 per cent. was obtained by distillation: this has a combined balsamic and alliaceous odour. The fruits gave 26 per cent. of pulp, resembling that of the official drug.

Castor, Cod-liver, Neatsfoot Oils, and a few Essential Oils, Optical Properties of. H. C. Lythgoe. (*Journ. Amer.*

Chem. Soc., **27,** 887.) partly reprinted in *Pharm. Journ.* [4], **21,** 277.) Tables are given of the refraction index and optical rotation of castor, cod-liver and neatsfoot oil; also of the essential oils of peppermint, sweet and bitter orange, lemon, citronella, nutmeg, lemongrass, spearmint, clove, wintergreen, cassia, and cinnamon.

Caryophyllin. H. Meyer and O. Hoenigsmid. (*Monats. f. Chem.*, **26,** 379, through *Schimmel's Report, November*, **1905,** 21.) The formula of crystalline caryophyllin from cloves is found to be $C_{40}H_{64}O_4$ and not $C_{10}H_{16}O$ as previously stated, since it forms the tetracetyl $C_{40}H_{60}(O.CO.CH_3)_4$, m.p. 268–271°C. It is oxidized by HNO_3 into caryophyllinic acid, the sodium salt of which furnishes the tetramethyl ester $C_{40}H_{60}(OCH_3)_4$, m.p. 159–160°. J. Herzog (*Berichte Pharm.*, **15,** 1905) has obtained a diphenyl urethane from caryophyllin

$$C_{40}H_{63}O_4.CO.N\begin{matrix}C_6H_5\\C_6H_5\end{matrix}$$

and a diacetyl compound. He also finds that caryophyllin forms crystalline salts when treated with alkalies.

Chelidonine, Further Investigation of. J. O. Schlotterbeck and B. S. Knapp. (*Proc. Amer. Pharm. Assoc.*, **1905,** 216.) It is found that chelidonine does not yield phenanthrene when distilled with zinc dust. When saturated with HCl at −20°C. and heated in a sealed tube no apochelidonine, but possibly amorphous trichelidonine is formed. When chelidonine is treated with PCl_5 chlor-chelionide, $C_{20}H_{18}ClNO_4$, is first formed, then a leuco-chlorinated compound, $C_{20}H_{17}ClNO_4$, and finally the red, crystalline monochlor-derivative, $C_{20}H_{15}ClNO_4.HCl$, m.p. 242°C. When fused with alkali, chelidonine splits up forming amines, and a crystalline compound, probably protocatechuic acid. Strong HNO_3 decomposes chelidonine, forming a non-nitrogenous acid, m.p. above 300°C., at which temperature it sublimes.

Chicle Gum, Constituents of. A. Tschirch and E. Schereswki. (*Archiv. der Pharm.*, **243,** 378.) Gum chicle, produced by *Achras sapota* contains gum soluble in water; three albanes, *a*-chicalbane, $C_{21}H_{40}O$, m.p. 219–221°C., *β*-chicalbane, $C_{18}H_{30}O$ or $C_{17}H_{28}O$, m.p. 158–159°C., and *γ*-chicalbane, $C_{15}H_{28}O$, m.p. 86–87°C.; also chicfluavil, m.p. 66–67°C. All these are

soluble in alcohol. The portion soluble in $CHCl_3$ comprised chicalbanane and chicagutta, the latter having the formula $C_{10}H_{16}$ or $C_{10}H_{18}$.

Chloral Hydrate, Quantitative Determination of. T. E. Wallis. (*Pharm. Journ.* [4], **22,** 162.) After destructive criticism of the method at present official in the B.P. 1898 for the quantitative determination of chloral hydrate, the following method is suggested to replace this: Dissolve 0·1 Gm. of chloral hydrate in 10 c.c. of alcohol, and introduce it into a bottle with 10 c.c. of volumetric solution of sodium hydroxide; close the bottle with an india-rubber cork held in position by a piece of string, and heat it in a water-bath for 3 hours. Neutralize the resulting liquid with volumetric solution of sulphuric acid, using phenolphthalein as indicator, and titrate with volumetric solution of silver nitrate, of which not less than 18·1 nor more than 18·3 c.c. should be required for complete precipitation. Experimental details and theoretical arguments in support of this method are given.

Chloretone, Assay of. G. Denigès. (*Repertoire*, [3], **17,** 491.) Ten c.c. of a 1 per cent. solution of the chloretone in water and alcohol, is treated with 0·5 c.c. of NaOH solution 30 per cent., free from NaCl, and 10 c.c. of alcohol 90-95 per cent. The mixture is then boiled, cooled and treated with 0·5 c.c. of HNO_3, sp. gr. 1·39, and made up to 100 c.c. with distilled water. Each mol. of chloretone (molecular weight, 186·5) gives 3 mols., NaCl, which is then titrated in the usual manner with N/10 $AgNO_3$ solution and K_2CrO_4 indicator. If exactly 62·15 c.c. of the liquid be taken for this purpose, each c.c. of N/10 $AgNO_3$ used up $\times 10$ gives the percentage of chloretone. If the NaOH solution contains chlorides, it may be used, after titrating the amount, and subsequently making the equivalent deduction.

Chloroform, Determination of Alcohol in. M. Nicloux. (*Bull. Soc. Chim.* [3], **35,** 330.) The chloroform is shaken out with two successive washings with water; the aqueous washings are bulked, and, if necessary, diluted to a known volume so that the amount of alcohol does not exceed 1 : 500. Five c.c. of this solution is measured off and treated with 0·1 or 0·2 c.c. of a solution of $K_2Cr_2O_7$, 19 Gm. per litre, followed by 4·5 or 5 c.c. of pure H_2SO_4, sp. gr. 1·847. The liquid becomes hot and a

change of colour is evident. More of the standard $K_2Cr_2O_7$ solution is then run in, the liquid being heated cautiously to boiling, after each addition, until the colour changes from greenish blue to persistent greenish yellow. The number of c.c. of $K_2Cr_2O_7$ used gives the percentage of alcohol present. A second experiment should be made, adding at once to the hot liquor 0·1 c.c. less of the standard $K_2Cr_2O_7$ solution, when the tint of the liquid should be greenish blue. On repeating the test with a third 5 c.c., but add 0·1 c.c. more $K_2Cr_2O_7$, a greenish yellow liquid will result.

Chloroform, Determination of Small Quantities of. M. Nicloux. (*Bull. Soc. Chim.* [3], **35,** 321.) *In alcoholic solution.* Sixty Gm. of an alcoholic solution not containing more than 0·10 Gm. is made up to 60 c.c. with alcohol 90 per cent., and boiled for 30 to 60 minutes under an efficient reflux condenser with 10 c.c. of 10 per cent. alcoholic solution of KOH free from Cl. The flask is then cooled, a little water is added with 2 drops of phenolphthalein solution, followed by pure diluted HNO_3 until the colour is discharged. Excess of acid is removed by means of a little pure $CaCO_3$; or the alkaline liquid may be neutralized with N/10 H_2SO_4, the K_2SO_4 precipitated being ignored. The chlorine is then titrated in the usual manner with K_2CrO_4 indicator. The $AgNO_3$ solution may conveniently contain 8·535 Gm. per litre, when 1 c.c. = 2 Mgm. $CHCl_3$.

In the air. Air or other gas containing $CHCl_3$ is passed slowly through potash bulbs charged with alcohol, then treated as above.

In aqueous liquid, urine, or blood. Five times its volume of alcohol 80 to 95 per cent. acidified with 0·25 Gm. of tartaric acid, is added and the mixture is distilled; the end of the delivery tube dipping beneath a little alcohol in the receiver. The distillate is then treated as above.

Chrysophanic Acid. O. A. Esterle. (*Archiv. der Pharm.*, **243,** 434.) Although so-called chrysophanic acids have been isolated from many plants of the N.O. *Polygonaceæ*, from Goa powder, senna, etc., they are evidently different, the m.p.s ranging from 156° to 192°C.; and several of them contain methoxyl groups. Pure chrysophanic acid, $CH_3.C_6H_3:(CO)_2:C_6H_2(OH)_2$, in deep golden yellow scales, m.p. 196°C., was obtained by oxidizing chrysarobin, and eliminating the methyl esters. The pure acid forms the mono-methyl ester $CH_3.C_6H_3:(CO)_2:$

C_6H_2:(OH).OCH_3 in orange needles, m.p. 204°C., and the dimethyl ester $CH_3.C_6H_3$:$(CO)_2$:C_6H_2:$OCH_3.OCH_3$, in yellowish orange needles, m.p. 195°C. It is thought that the lowering the m.p. of the acid as obtained from various sources is not due to the presence of methyl esters of chrysophanic acid, but to that of a trioxymethylanthraquinone.

Cinchona Bark, Determination of Total Alkaloid in. (*Caesar and Loretz's Report, September*, **1905,** 98. *Gravimetric method.* 25 Gm. of the air dry bark, in fine powder, is heated in a flask with 2 c.c. of 25 per cent. HCl and 20 c.c. of water for 10 minutes on the water-bath. After cooling, ether 50 Gm. and chloroform 25 Gm. are added; after thorough shaking 5 c.c. of NaOH solution 15 per cent. is run in and the whole shaken up thoroughly for 10 minutes. Tragacanth powder 1·5 Gm. is then added and the agitation repeated. After standing, the clear ether chloroform extract is run through fat-free cotton wool into a flask. Sixty Gm. of the filtrate (= 2 Gm. of the bark) is weighed off and transferred to a separator, and shaken out successively with 20, 10, and 10 c.c. of 1 per cent. HCl solution. If a portion of the last acid washing shows an opalescence with Mayer's reagent, the chloroform extract must be shaken out with another 10 c.c. of the dilute acid. The bulked acid extract is then made alkaline with AmOH and the liquid shaken out with $CHCl_3$ in successive quantities. The $CHCl_3$ extracts are filtered into a tared Erlenmeyer flask and the $CHCl_3$ distilled off. The residue is dried at 100°C. until constant and weighed. The weight × 50 gives the percentage of total alkaloid.

Volumetric method. Sixty Gm. of the above ether-chloroform extract of the bark (= 2 Gm. of the original bark) is distilled and the residue dissolved in 10 c.c. of alcohol 90 per cent. and 10 c.c. of ether; 30 c.c. of water is added and the mixture titrated, with thorough shaking with N/10 HCl solution and hæmatoxylin indicator. Towards the end of the titration first 10 c.c., then 30 c.c., of water is added, and addition of acid continued until a lemon yellow colour is obtained. Each 1 c.c. of N/10 HCl = 0·0309 Gm. of total alkaloid, so that the number of c.c. of acid solution used × 0·0309 × 50 gives the percentage of total alkaloid in the bark.

Citronella, Essential Oil of, Adulterated. (*Schimmels' Report, November*, **1905,** 19.) A sample of citronella oil from Marseilles

was found to be adulterated with 11·2 per cent. of alcohol, which was detected by shaking out with salt solution. Another specimen was met with which was sophisticated with lemon oil terpenes. This oil had the sp. gr. 0·8852; $a_D + 11° 44'$; total geraniol, 29·6 per cent.

Citronella Oil and Schimmels' Test. C. E. Sage. (*Chem. and Drugg.*, **68**, 355.) The oil examined was distilled at the Government Experimental Station at Peradeniya, and was offered in London with a view to determining the price obtainable for a perfectly genuine oil. It gave a turbid solution with Schimmels' test, although free from kerosene or other adulterants. It contained 36 per cent. of citronellal and 41 per cent. of geraniol. Schimmels' test was instituted to detect the presence of kerosene; pure oils have been met with before which have not responded to the test, although free from mineral oil. The opinion is expressed that the test should be discarded.

Coca Leaves, Alkaloidal Assay of. Greshoff. (*Pharm. Weekblad*, through *Journ. Pharm. Chim.* [6], **22**, 76.) The following is the method employed at the Colonial Museum at Haarlem for the assay of Javan coca leaves. The process depends on the splitting up of cinnamyl cocaine into ecgnine, which is then transformed into cocaine. 30·5 Gm. of dried powdered leaves are placed in a flask with 300 c.c. of alcohol 90 per cent. and the gross weight is noted. The flask is then attached to an upright condenser, and kept at 80°C. on the water bath for 2 hours. After cooling, the original weight is made up by the addition of more alcohol, and 150 c.c. = 15 Gm. of the leaves, is filtered off. This filtrate is distilled, and the residue is heated on the water bath with frequent agitation, with 20 c.c. of water. After cooling, the aqueous solution is filtered and the insoluble residue washed with tepid water until the total filtrate measures about 60 c.c. This is transferred to a separator, and shaken out with two successive 30 c.c. of ether. The ether layers are removed and rejected. The aqueous portion is then rendered alkaline with ammonia and again shaken out with 3 successive 30 c.c. of ether. The bulked ethereal extract is distilled in a tared flask, and the residue is dried in the stove, a current of dry air being aspirated through the flask, which removes a trace of oily volatile alkaloid with a strong

tobacco-like odour. If the residue be then dark coloured it is redissolved in a little 1 per cent. H_2SO_4 solution, again liberated with AmOH and shaken out with ether. This treatment occasions the loss of 0·1 per cent. of alkaloid. The ether is again driven off and the residue is dried for 3 hours at 95°C. and weighed. Young leaves carefully dried away from contact with the air are found to yield, by this method, 2·02 per cent. of total alkaloids. Old leaves, dried under similar conditions, gave 0·78 per cent. The young leaves from the top of the tree are richer in alkaloids than those from the base; the percentages obtained being 2·1 and 1·2 per cent. respectively. Since the method of drying and the period of storing influence the amount of alkaloids in the leaves, such high percentages as these, found in specially prepared products, are not met with in commercial samples. Yet the amount of total alkaloids in these should not fall below 0·6 to 0·7 per cent.

Coca, Liquid Extract of, Alkaloidal Assay of. P. Roeder. (*Pharm. Zeit.*, **51,** 322.) Fifteen Gms. of the fluid extract is shaken in a flask with 120 Gm. of petroleum ether and 10 c.c. of solution of ammonia, 10 per cent., for 2 hours. After allowing to subside, 100 Gm. of the clear petroleum ether solution is decanted, and shaken out with 30, 20, 10, and 10 c.c. of 0·5 per cent. HCl solution. The bulked acid extracts are made alkaline with ammonia, then strongly shaken with exactly 100 Gm. of ether and allowed to stand for 1 to 2 hours. Exactly 80 Gm. of ether is then decanted (= 10 Gm. of the original extract) and filtered through a dry filter into a tared flask. The solvent is distilled off and the residue dried for 3 hours at 100°C. and weighed. The weight × 10 gives the percentage of total alkaloids.

Cocaine Formate. F. Vigier. (*Journ. Pharm. Chim.* [6], **23,** 97.) The salt, $C_{17}H_{21}NO_4.CH_2O_2$, is obtained by saturating the alkaloid suspended in water with an equivalent of pure formic acid. On evaporating at a low temperature the slightly yellow syrupy liquid deposits crystals, on cooling, in the form of long silky needles, m.p. 42°C., solubility in water, 1 : 41 at 20°C.; the solution is perfectly neutral. When heated, the salt is dissociated, the free base separating out in oily drops at about 90°C.

Cod-liver Oil and other Fish Oils. R. T. Thomson and H. Dunlop. (*Journ. Soc. Chem. Ind.*, **24**, 741.) The pharmacopœial tests should be modified; the range of the iodine value being extended to 181, and the sp. gr. to range from 0·923 to 0·931; while the unsaponifiable matter should not exceed 1·5 per cent. It is impossible at present to differentiate between ling, coalfish, hake, whiting, haddock, skate liver oils and cod-liver oil, but dogfish-liver oil contains 8·4 per cent. of non-saponifiable matter and shark liver oil 15·28 per cent. Dogfish oil has a very low saponification value, 169·7; while that of porpoise blubber oil is very high, 256·6.

Cod-liver Oil, New Reaction for. S. Vreven. (*Annales de Pharm.*, **12**, 97.) About 5 c.c. of the oil is dissolved in an equal volume of ether and treated with 25 c.c. of alcohol 92 to 98 per cent. After standing, the clear liquid is decanted into a flat-bottom porcelain capsule, and fuming nitric acid, sp. gr. 1·48, is added drop by drop. As each drop falls, a fugitive sky blue colour is formed.

Colloidal Copper. C. Paal and W. Lenze. (*Berichte*, **39**, 1550.) Colloidal copper in both blue and red forms is obtained by the action of hydrazin on solutions of soluble copper salts. On treating strong solutions, the blue unstable modification is obtained. If the mixture be heated the liquid gelatinizes and deposits metallic copper in glittering spangles. By using dilute copper solutions, the stable red modification is obtained; the reaction begins in the cold; on warming, the solution becomes darker and bright red by transmitted light. On evaporating and drying *in vacuo* glittering black scales with a purple iridescence are obtained; these are soluble in water, giving a red solution with transmitted light. On standing, this is oxidized to colloidal copper oxide, but it may be preserved for a year if kept in stoppered bottles.

Colloidal Gold, Formation of, with Essential Oils. L. Vanino and F. Hartl. (*Berichte*, **39**, 1696.) If 0·0181 Gm. of gold chloride dissolved in 3 litres of water is treated with 5 c.c. of oil of turpentine, a fine red colour, due to colloidal gold, is formed, which becomes dark violet on warming. With half the quantity of gold, a violet red colour is given in the cold. Pinene and rosemary oil give similar results. The coloured solution passes

through a filter, and may be boiled without forming a metallic precipitate.

Conium Alkaloids, Separation of. —. Braun. (*Berichte*, **38**, 3108, through *Journ. Pharm. Chim.* [6], **23**, 298.) The bases hitherto isolated from conium are lævo- and dextro-conine, lævo- and dextro-methyl conine, γ-coniceine, conhydrine and pseudo-conhydrine. Working on 104 Gm. of the mixed basic by-products obtained in the commercial manufacture of conine, it was resolved into the following constituents: Conhydrine, 1 Gm.; methyl-conine, 7 Gm.; coniceine, 26 Gm.; and conine, 68 Gm. On distilling this mixture *in vacuo* almost all passed over below 190°C. The residue, crystalline on cooling, was non-volatile conhydrine. On benzoylating the distillate conine was converted into benzoyl-conine, and γ-coniceine formed a ketone, benzoyl-4-amino-butyl ketone, while methyl-conine, being a tertiary base, did not react. On shaking out the ether solution with dilute HCl the last base was removed as hydrochloride, the benzoyl-compounds remaining in the ether. To separate these two, the ethereal residue was fractionated *in vacuo* when benzoyl-conine passes over, leaving the ketone as a non-volatile residue. From these the original bases were regenerated in the usual manner.

Conium maculatum, Nature of the Crystals in. —. Tunmann. (*Pharm. Zeit.*, **50**, 1055.) In 1882 A. Meyer recorded the occurrence of sphærocrystals when the fresh leaves of hemlock are immersed in alcohol, and attributed these to the presence of hesperidin. Tunmann has reinvestigated the matter, and, while confirming the fact, the occurrence of the sphærocrystals both in the fresh and dried herb under the conditions named, has not been able to identify the constituent body. In appearance they closely resemble inulin. In addition to these the presence of larger prismatic crystals was noted, which were insoluble in solution of chlorinated soda, whereas the sphærocrystals were dissolved by that reagent. The prisms give yellow solutions with benzol and chloroform and give a blue colour with H_2SO_4. They appear to be formed of a colouring body allied to carotin. They are soluble in phenol solution, in which the sphærocrystals are insoluble. In addition to these two forms of crystals, hemlock leaves also show octahedra of calcium oxalate.

Copal, Kauri, and Manila, Essential Oils of. L. Schmoelling. (*Chem. Zeit.*, **29**, 955.) *Kauri copal oil* is a bright yellow, mobile, aromatic fluid, permanent in the air; sp. gr. 0·8677 at 15°C.; acid value, 3·0; saponification value, 4·9; iodine value, 288·9. The major fraction boils between 150–160°C. It probably contains limonene as well.

Manila copal oil is reddish, darkening on exposure to the air; sp. gr. 0·9069 at 15°C.; acid value, 28·3; saponification value, 45·7; iodine value, 230·4; only about one-fifth distils below 160°C. and 30 per cent. between 160–185°C. Only about 50 per cent. of the crude oil distils with steam, whereas the oil of Kauri copal is almost wholly volatile under these conditions. The water of distillation is very acid; from it formic and acetic acids have been isolated.

Coto Bark, False, New Crystalline Principle from. O. Hesse. (*J. f. Prakt. Chem.*, through *Journ. Pharm. Chim.* [6], **23**, 522.) A false coto bark, resembling the true drug in anatomical characters, is found to contain no cotoine, but to yield to ether a crystalline neutral principle, cotellin, $C_{20}H_{20}O_6$, m.p. 169° C. It contains no free hydroxyl groups but probably has two methoxyl nuclei.

Coto Bark, Recognition of. (*Caesar and Loretz's Report, September*, **1905**, 81. Ten Gm. of the powdered bark is macerated with 100 Gm. of ether for 1 hour with frequent shaking. The ether is then filtered off into a flask, 50 c.c. of water is added and the ether distilled. When cool, the aqueous residue is shaken out with 30 Gm. of petroleum ether to remove resin, the watery layer is withdrawn and evaporated in a porcelain dish on the water-bath. The residue dissolved in a little acetic acid should give a blood red colour with one drop of fuming HNO_3.

Cotton and Linen, Test to Differentiate. A. Herzog. (*Apoth. Zeit.*, **20**, 891.) A small piece of the material is macerated in a tepid alcoholic solution of cyanine, washed free from excess of dye with water, then immersed in dilute H_2SO_4. The colour is completely discharged from the cotton fibres, but linen retains the blue tint; on washing with water and immersing in ammonia, the colour in the flax fibres is intensified.

Cream of Tartar, Analysis of. E. J. Parry. (*Chem. and Drugg.*, **67**, 838.) For the detection of lead a modification of Warington's test is applied; for arsenic, Gutzeit's method is preferred. The direct titration method for determining the amount of $KHC_4H_4O_6$ is commended, and modified as needed, for crude tartars.

Cresols, Crude, Approximate Determination of Cresols and Phenols in. (*J. D. Riedel's Report*, through *Pharm. Zeit*, **51**, 266.) Ten c.c. of the crude cresol is dissolved in a graduated cylinder in 10 c.c. of petroleum ether; the solution is then well shaken up with 15 per cent. NaOH solution 40 c.c.; water, 40 c.c., is added to the mixture which is well shaken, and is set aside. When separated, the volume of the oily layer is read off; 10 c.c is deducted therefrom for the petroleum ether added, the remainder being the volume of non-cresols. The whole is then transferred to a separator, and the alkaline liquid drawn off into the same cylinder. This is treated with 30 c.c. of HCl, sp. gr. 1·124, and 10 Gm. of NaCl. After shaking, the mixture is set aside and the volume of the oily layer, representing the cresols and phenols, read off. With raw cresol, containing 20 to 25 per cent. of cresols and phenols, this should be about 2·5 c.c.

Cryptomeria japonica, Essential Oil of. K. Keimazu. (*Pharm. Journ. Jap.*, through *Schimmels' Report*, *May*, **1906**, 23.) A dextro-sesquiterpene, cryptene, allied to cadinene and a polyatomic phenol have been detected in this oil. (See *Year-Book*, **1903**, 70.)

Cusparia Bark Alkaloids. H. Beckurts and G. Frerichs. (*Archiv. der Pharm.*, **243**, 470.) In addition to the bases, cusparine, galipine, cusparidine and galipidine (*Year-Books*, **1892**, 135, **1904**, 73) the authors have isolated a fifth alkaloid, cuspareine, $C_{31}H_{36}N_2O_5$ from Angostura bark. The four first named crystalline bases are removed as tartrates by shaking out the ethereal solution of the mixed alkaloids with aqueous tartaric acid. Cuspareine remains in the ether solution, together with the amorphous alkaloids. It is separated from these, in solution in petroleum ether, by treatment with picric acid. Cuspareine picrate remains in solution, and crystallizes out on evaporation. When liberated from this combination, it crystallizes in fine colourless needles arranged in feathery or stellate

groups. It is a very feeble base and does not form salts, being shaken out with ether from solution in HCl. It is very stable, volatilizing without decomposition at 300°C.

Datura alba, Mydriatic Alkaloids of. E. Schmidt. (*Archiv. der Pharm.*, **244**, 66.) *Datura alba*, Nees, is considered to be identical with *Datura fastuosa*, two double-flowered varieties of which occur in cultivation, one with white, the other with blue flowers. The seeds of the white-flowered variety were found to contain 0·20 per cent. of scopolamine and 0·023 per cent. of hyoscyamine. The blue-flowered kind gave 0·216 per cent. of scopolamine and 0·034 per cent. of hyoscyamine.

Datura stramonium, Distribution of Alkaloids in. J. Feldhaus. (*Archiv. der Pharm.*, **243**, 328.) The following amounts of alkaloid, extracted by ether-chloroform, and titrated with N/100 H_2SO_4 solution by a modification of Keller's method, are expressed in percentages of atropine. The immature seeds contained 0·33 per cent., the main root 0·10; rootlets, 0·25; stem, 0·09; upper branches, 0·36; leaves, 0·39; pistil, 0·54; corolla, 0·43; calyx, 0·30; pericarp of young fruit, 0·34; pericarp of ripe fruit, 0·082; placentas of ripe fruit, 0·28; ripe seeds, 0·48; young seedlings from these seeds, 0·67 per cent. These results are in accord with those of the microchemical examination. The greater part of the alkaloid is found in parenchymatous tissue in the neighbourhood of active vegetative points. The assimilative parenchyma, however, contains a relatively small amount of bases.

Dihydrolaurolene and Dihydro-iso-laurolene, Constitution of. Nora Renouf. (*Pharm. Journ.* [4], **22**, 157, 252.) The constitution and characters of these bodies are discussed at length.

Dika Fat. J. Lewkowitsch. (*Analyst*, **30**, 394.) The decorticated seeds of *Irvingia barteri* from Nigeria gave 54·3 per cent. of solid fat; sp. gr. at 40°C.; (water 40° = 1) 0·914; m.p., 38·9°C.; saponification value, 244·5; iodine value, 5·2. These figures differ markedly from those formerly recorded by Dieterich, who probably worked with impure material. [See *Year-Book*, **1898**, 45.]

Drugs, Chemicals, and Galenicals, Testing, by Dispensing Chemists. H. W. and S. C. Gadd. (*Pharm. Journ.* [4], **21**, 438, 520, 579, 901.) A series of articles giving simple tests and methods of assay for drugs and galenicals, adapted to the needs and appliances of the pharmacy.

Drugs, Quality of, Imported into the Port of New York. R. W. Moore. (*Proc. Amer. Pharm. Assoc.*, 1905, 263.) *Asafetida.* The quality of the drug has shown improvement since the enforcing of the U.S. Treasury standard of 50 per cent. of resin and 3 per cent. of essential oil. In one case, only 3·66 per cent. of the samples examined were of the requisite purity; within six months the number rose to 47·75 per cent. In 1899 13 samples only contained 10 and less per cent. of resin.

Jalap is required to give 11 per cent. of resin. In 1904, 98 samples were examined, 28 of which were below the standard. The maximum found was 23·34 per cent., the minimum 6·14 per cent. Since then 276 samples have been dealt with, and only 20 were equal to the standard. The maximum of these was 15·63 per cent. and the minimum 2·10 per cent. Of the inferior quality, much was imperfectly dried.

Guaiacum resin has a standard of 80 per cent. of resin; 124 samples were examined, of which 69 were below the standard. The maximum percentage of resin was 91·4, the minimum 61·7. Careless collection, and neglect of straining to remove bark and foreign impurities were the chief faults of the inferior samples.

Senna is required to contain 28 per cent. of soluble matter. All the samples examined exceeded this amount.

Opium was generally good. Only 19 samples out of 309 examined were rejected for containing less than 9 per cent. of morphine.

Ipecacuanha. Formerly only Rio ipecacuanha was admitted, but lately the Cartagena variety has been passed, provided it contained 1·8 per cent. of alkaloids. Of 204 samples examined 10 were below this standard.

Lupulin. Twenty-five samples were examined; 2 contained less than 10 per cent. of ash, and 12 gave above the minimum of 70 per cent. of ether soluble extract.

Erigeron canadensis, Essential Oil of. F. Rabak. (*Pharm. Review*, **23**, 81, through *Schimmel's Report, November*, 1905, 23.) Fresh fireweed yielded 0·66 per cent. of bright yellow oil, sp. gr.

at 22°C., 0·8614 ; $\alpha_D + 67° 16'$; acid value, 0 ; ester value, 108 ; acetyl value, 0 ; aldehyde (as citronellal), 0·77 per cent. The dried herb gave 0·26 per cent. of oil ; sp. gr. at 22°C., 0·8610 ; $\alpha_D + 76° 37'$; acid value, 0 ; ester value, 52 ; acetyl value, 34 ; aldehyde (as citronellal), 0·44 per cent. The free alcohol found only in the oil from the dried herb is probably derived from the decomposition of the ester ; it is probably terpineol. See *Year-Books* **1887**, 285, **1894**, 79, **1903**, 81.

Eryngium campestre, Essential Oil of. (*Schimmel's Report, November*, **1905**, 73.) The oil distilled from the fresh herb in the south of France has a pleasant odour resembling that of abelmoschus seeds ; sp. gr. at 15°C., 0·9043 ; $\alpha_D - 5° 42'$; ester value, 10·47.

Eserine Acid Sulphate. (*J. D. Riedel's Report*, through *Pharm. Zeit.*, **51**, 265.) This salt, $C_{15}H_{21}N_3O_2.H_2SO_4$, which has a less intense physiological action than the official neutral sulphate is obtained as follows. One hundred Gm. of pure crystalline eserine is dissolved in ether sp. gr. 0·702 and a solution of H_2SO_4 sp. gr. 1·84 in a mixture of acetone 50 c.c., and ether 75 c.c. is added thereto, drop by drop, with constant agitation. The crystalline precipitate thus obtained is collected, washed with ether, sp. gr. 0·720, and dried, the last traces of ether being driven off in a warm vacuum dryer. The salt is very hygroscopic and gives an acid solution with water.

Eserine Sulphite. E. Merck. (*Pharm. Zeit.*, **51**, 283.) This salt is introduced for the preparation of eserine solutions, which will not change colour on keeping. It is a white amorphous powder, readily soluble in water and in alcohol.

Eucalyptus, Essential Oils of, New. R. T. Baker and H. G. Smith. (*Pharm. Journ.* [4], **21**, 356, 382.)

Oil of Eucalyptus calophylla is dark red, with a turpentine odour ; sp. gr. 0·8756 at 15° ; $\alpha_D + 22·9°$; saponification value, 10·51. It consists chiefly of dextropinene with cymene, sesquiterpenes and acetic esters.

Oil of E. diversicolor is bright lemon yellow, with a turpentine odour. Sp. gr. at 15°C. 0·9145 ; $\alpha_D + 30·1°$; saponification value, 53·2. It contains dextropinene, less than 5 per cent. of cineol, and 20 per cent. of acetic esters.

Oil of E. salmonophloia is of a reddish colour. Sp. gr. 0·9076 ; $\alpha_D + 6·3°$. It contains pinene, cineol (50 per cent.), and a little aromadendral.

Oil of E. reduncu is red when crude, almost colourless when rectified. Sp. gr. 0·9097 : $\alpha_D + 13·5$. It contains about 40 per cent. of cineol and much dextropinene, with traces of esters and a little sesquiterpene.

Oil of E. occidentalis is red when crude, almost colourless when rectified. Sp. gr. 0·9135 at 15°C. ; $\alpha_D + 9°$. It is similar in constituents to the oil of *E. redunca*, but contains more sesquiterpene and a little aromadendral.

Oil of E. marginata, from mature leaves and suckers, is red in colour, and differs slightly in physical characters. It contains cymene, aromadendral and a little cineol and pinene ; an acetic ester, probably of geraniol, is present.

Oil of E. gomphocephala is reddish in colour and unpleasant in odour. It consists chiefly of terpenes, and contains much phellandrene with an acetic ester.

E. salubris oil is reddish orange in colour, and has a strong odour of aromadendral, of which it contains a considerable quantity. The sp. gr. is 0·902 at 15°, and the $\alpha_D - 5·8°$. Besides aromadendral, it contains lævopinene, cymene, 10 per cent. of cineol and esters, probably chiefly geranyl acetate. Aromadendral isolated from this oil had the sp. gr. 0·9532 at 22°, b.p. 218–219°C., with partial decomposition. It has the formula $C_9H_{12}O$; oxidized with $K_2Cr_2O_7$ and H_2SO_4 it forms a monobasic aromadendrinic acid, $C_9H_{12}O_2$, m.p. 137–138°, after drying at 105–110°C. The air-dry crystals are melted indefinitely at a lower temperature. From the different characters of the aldehyde derived from various species of Eucalyptus, it is considered probably that aromadendral occurs in two optical modifications ; probably it is also accompanied, in some cases, by cuminal.

Eucalyptus globulus, Essential Oil of, Presence of Pinocarveol in. O. Wallach and F. Jaeger. (*Chem. Centralb.*, 1905, **2**, 674.) An alcohol of the generic formula $C_{10}H_{16}O$, isolated from the higher boiling fractions of *Eucalyptus globulus* oil, has been identified as optically active pinocarveol ; sp. gr. 0·9745 at 20°C. ; $[\alpha]_D - 52·45°$ in 12·75 per cent. ethereal solution ; b.p. 92°C. under 12 mm.

Eucalyptus staigeriana, Essential Oil of, R. T. Baker and H. G. Smith. (*Pharm. Journ.* [4], **22**, 571.) After describing

the botanical characters of the tree and the physical properties of the oil, its chemical composition is dealt with in detail. Its chief constituents are found to be: Limonene, 60 per cent.; geraniol, 12·7 per cent.; geranyl acetate, 8·3 per cent.; and citral, 16 per cent.

Euonymus, Dried Extract of, B.P. W. P. Cowie and W. Dickson. (*Pharm. Journ.* [4], **22,** 281.) Four commercial samples examined ranged in ash content from 30·2 to 22·9 per cent. In all cases, the greater part of the ash consisted of calcium phosphate.

Euphorbium Resin, Constituents of. A. Tschirch and Paul. (*Archiv. der Pharm.*, **243,** 249.) Euphorbium resin is found to contain 0·7 per cent. of an amorphous acid, *euphorbic acid*, $C_{24}H_{36}O_5$; a trace of an unidentified aldehyde; 2 resenes, one crystalline, *euphorbone*, $C_{36}H_{48}O_1$, 40 per cent.; the other, amorphous and insoluble in KOH, 21 per cent.; a hydro-carbon, 2 per cent., soluble in water, but not a gum; water-soluble malates 25 per cent., and an acrid principle. It contains no gum and no essential oil.

Fennel, Galician, Constituents of Essential Oil of. (*Schimmels' Report, May,* **1906,** 36.) In addition to the constituents already known to occur in fennel oil, camphene and α-phellandrene, with traces of a basic body and of aldehydes, have been detected in the oil from Galician fruits. No cymene was found. [See *Year-Books,* **1891,** 215; **1894,** 180.]

Formaldehyde, Determination of, in Tri-oxymethylene Tablets. E. Rust. (*Zeits. für angew. Chem.* through *Journ. Pharm. Chim.* [6], **22,** 390.) A weighed quantity, about 2 Gm. of the powdered material, is treated in an Erlenmeyer flask, fitted with a funnel, with 70 c.c. of N/KOH solution. When the powder has dissolved from 9 to 10 Gm. of pure neutral H_2O_2 solution, 30 per cent. is added gradually, which transforms the trioxymethylene into formic acid. After 2 hours' contact, the mixture is boiled to decompose the excess of H_2O_2. The funnel is then washed and removed, and a few drops of phenolphthalein solution are added, producing a red colour. N/H_2SO_4 solution is cautiously added to exactly neutralize the alkali; then N/KOH

is run in, employing the same burette as before, until the rose tint of the phenolphthalein reagent is permanently restored. Each 1 c.c. of N/KOH thus used is equivalent to 0·03 Gm. of CH_2O. If the original material contain free acid, this must be determined, and the necessary correction made therefor.

Formaldehyde, Modified Hehner's Test for. A. B. Lyons. (*Proc. Amer. Pharm. Assoc.*, **1905,** 326.) Fifty Mgn. of dry beef peptone is added to 5 c.c. of the liquid to be tested; 1 c.c. of a reagent, consisting of H_2SO_4 25; tincture of ferric chloride 1. is then run in, when a characteristic violet red zone is formed, if formaldehyde be present. If the mixture be heated, the whole of the liquid assumes this colour. In very dilute solutions of formaldehyde the colour passes from garnet red to amber. With these, the reagent should be applied to distillates, and the amount of tincture of ferric chloride should be lessened to 1 : 60 or 1 : 80 of H_2SO_4. The test is of extreme delicacy. It is claimed that it will detect 1 minim of formalin in 17 gallons of water. Attention is drawn to the characteristic taste of formalin even in extreme dilution. It is stated that 1 minim in 10 gallons of water may be thus detected. The taste is not produced at once, but after some minutes the characteristic tingling and numbness of the tongue are evident.

Gelsimium, Comparative Alkaloidal Strength of Fresh and Dried Rhizome. L. E. Sayre. (*Proc. Amer. Pharm. Assoc.*, **1905,** 282.) From experiments with fresh root preserved in alcohol and the ordinary dry drug, it is considered that the rhizome loses some of its physiological activity in drying. The fresh rhizome was found to contain 0·265 per cent. of alkaloids; the dried drug rarely exceeds 0·2 per cent., and, as a rule, does not contain so much.

Gentian Root, Constituents of. G. Tanret. (*Bull. Soc. Chim.* [3], **23,** 1059, 1071, 1073.)

Gentiopicrin.—Fresh crushed gentian root is thrown into 3 times its weight of alcohol, 85 per cent., and heated to boiling: the mass is then pressed, and the liquid evaporated to an extract. This is made into a 17 per cent. solution with water, and shaken out 25 to 30 times with successive washings of acetic ether saturated with water. The acetic ether is distilled off until on cooling it deposits a syrupy mass, which, on drying in

the air, becomes crystalline; it is then dissolved in an equal weight of boiling absolute alcohol, from which the gentiopicrin crystallizes on cooling. After draining and washing with absolute alcohol, it is still impure, colouring with Fe_2Cl_6 due to the presence of a trace of gentiin. It is purified by recrystallization from acetic ether, containing 2 per cent. of water. By this method the yield is from 7 to 14 per cent., calculated on the dry alcoholic extract. It crystallizes in two forms: anhydrous, $C_{16}H_{20}O_9$ from absolute alcohol and acetic ether; sometimes anhydrous, more often hydrated, $C_{16}H_{20}O_9 + \frac{1}{2}H_2O$ from water and hydrated acetic ether; frequently both forms of crystals are deposited from these solutions. The hydrated form melts at 121–122°C.; the anhydrous at 191°C. Hydrated gentiopicrin does not sensibly lose weight at normal temperatures over H_2SO_4, and very slowly at 100°C.; it requires a temperature of 105°C. for complete dehydration. The crystals do not effloresce in the air. The crystals, both anhydrous and hydrated, are white microscopic orthorhombic prisms. They are very bitter, but without astringency; soluble 1 : 4 in water at 15°C., 1 : 2·3 in alcohol 60 per cent., 1 : 54 in cold 99·1 per cent. alcohol and 1 : 6·9 in the same boiling. It is more soluble in hydrated than in absolute acetic ether. The rotation of the hydrated glucoside is $\alpha_D - 198°\ 75'$; when anhydrous, $\alpha_D - 201·2°$. It is not precipitated by tannin nor by neutral salts; but its tannate is precipitated on saturating the solution with $MgSO_4$. It is a lactone, combining with alkalies, forming salts; with KOH it gives the compound $C_{16}H_{21}O_{10}K$. On acidifying these, gentiopicrinic acid is liberated, but it is unstable, and is soon reconverted into gentiopicrin. Gentiopicrin is not precipitated by neutral lead acetate. It gives, when acetylized, the pentacetyl $C_{16}H_{15}O_4\ (C_2H_3O_2)_5$ in fine white needles, m.p. 139°C. Gentiopicrin has a slight reducing action on Fehling's solution. It is slowly hydrolized by boiling with HCl; but is readily split up by emulsin, forming glucose and crystalline gentiogenin according to the equation—

$$C_{16}H_{20}O_9 + H_2O = C_{10}H_{10}O_4 + C_6H_{12}O_6.$$

Gentiogenin is isolated from the products of the above hydrolysis by means of 80 per cent. alcohol and subsequent recrystallization. It forms white microscopic needles, containing $\frac{1}{2}$ mol. H_2O, sparingly soluble in cold water and insoluble in ether; m.p. 185°C. after drying at 100–110°C., but, if heated quickly,

it decomposes at a higher temperature. It forms a tetra-acetyl compound, $C_{10}H_6O_4(C_2H_3O_2)_4$, in fine needles, m.p. 324–326°C., when acetylized in the presence of $ZnCl_2$. When heated with acetic anhydride alone it gives the ether $C_{20}H_{18}O_7$ by the condensation of 2 mols. of gentiogenin and elimination of 1 mol. H_2O, thus—

$$2C_{10}H_{10}O_4 - H_2O = C_{20}H_{18}O_7.$$

Gentiogenin gives an intense blue colour when a trace is dissolved in pure H_2SO_4 and treated with a few drops of water. When the process of hydrolysis has been prolonged, or when evaporation is conducted in the air, a portion of the crystalline gentiogenin becomes amorphous, acquiring a red colour and becoming more soluble.

Ferments of Gentian. Gentian root contains an oxydase and a peroxydase, which act on the gentiopicrin, and account for its diminished quantity in the dried root.

Gentiamarin is an amorphous glucoside obtained from the mother liquors after crystallizing out the gentiopicrin. The extract obtained, after evaporating the alcohol, is treated first with ether, then with chloroform, and the insoluble residue is dissolved in water. Tannin is then added as long as a precipitate is formed; the liquid is filtered, a large excess of tannin is added to the filtrate, and the solution is saturated with $MgSO_4$. The precipitate is collected, washed with saturated $MgSO_4$ solution, then extracted with alcohol, 80 per cent. The alcoholic solution is treated with Pb2(OH), filtered, excess of Pb is removed with H_2SO_4, and the solution is evaporated *in vacuo*; any gentiopicrin present crystallizes out and is removed; gentiamarin is amorphous. It is soluble in all proportions of H_2O and absolute alcohol; its α_D oscillates between $-80°$ and $-90°$, probably due to traces of gentiopicrin. It slightly blackens iron salts. When hydrolized with emulsin, it gives an amorphous body distinct from gentiogenin. Gentiamarin is not a lactone. Its analytical numbers accord with the formulæ $C_{16}H_{22}O_{10}$ and $C_{16}H_{20}O_{10}$.

Gentiin is the glucoside sparingly soluble in water, which accompanies gentiopicrin, and accumulates in the acetic ether mother liquors. On evaporating these and extracting the residue with water, dissolving the insoluble residue in boiling 60 per cent. alcohol, gentiin crystallizes out on cooling, in microscopic yellowish needles. It is almost insoluble in cold water, but is

taken into solution by the gentiopicrin ; it melts at 274°C, and has the formula $C_{25}H_{28}O_{14}$. It gives a greenish black colour reaction with Fe_2Cl_6. When hydrolized, it splits up into glucose, xylose and gentienin, according to the equation—

$$C_{25}H_{28}O_{14} + 2H_2O = C_6H_{12}O_6 + C_5H_{10}O_5 + C_{14}H_{10}O_5$$

Gentiin is therefore the first recorded glucoside to yield xylose.

Gentienin.—The insoluble greenish deposit formed by the hydrolysis of gentiin is collected and dissolved in 90 per cent. alcohol and filtered through charcoal. On cooling, gentienin crystallizes out in fine yellow needles, commencing to sublime at about 195°C. and melting at 225°C. It has the formula $C_{14}H_{10}O_5$, and is therefore an isomer of gentisin. (See also *Year-Books*, **1892**, 61 ; **1894**, 61 ; **1901**, 66 ; **1903**, 86, 214.)

Gentiopicrin, Hydrolysis of, by Emulsin. H. Hérissey. (*Journ. Pharm. Chim.* [6], **22**, 249.) The author points out, commenting on the above investigations of Tanret on the gentian glucosides, that in 1899 he found, with H. Bourquelot, that gentiopicrin is hydrolized by emulsin, with the formation of crystalline gentiogenin, and that soluble organic ferments are to be preferred to chemical reagents for effecting the splitting up of glucosides.

Geranium, Essential Oil of, Adulterated. (*Schimmels' Report, November*, 1905, 36.) Benzoic acid, probably added in the form of an ester, to increase the apparent amount of geranyl tiglinate, has been detected as an adulterant of geranium oil.

Ginger, African, New Constituents in the Essential Oil of. (*Schimmels' Report, November*, **1905**, 38.) Cineol, citral and borneol have been isolated and identified from African ginger oil.

Gingergrass, Essential Oil of. H. Walbaum and — Huethig. (*Journ. prakt. Chem.*, **71**, 459.) The characters of East Indian gingergrass oil vary between wide limits ; sp. gr. at 15°C. 0·9277 to 0·9458 ; α_D −29°25′ to +22°40′ ; acid value, 0·9 to 3·2 ; acetyl value, 130 to 172. In the lower boiling fractions under 5 to 6 mm. pressure, *a*-dextro-phellandrene, di-pentene and limonene were isolated. The portion distilling between 80° and 90°C. at this reduced pressure contains an aldehyde of the generic formula $C_{10}H_{16}O$, resembling citronellal

and heptyl aldehyde in odour. Under 754 mm. pressure it boils at 221–224°C.; sp. gr. at 15°C. 0·9351. It is readily oxidized in the air into the acid $C_{10}H_{16}O_2$. Its semicarbazide melts at 115–116°C.; its phenyl-hydrazone at 63°C. The alcohol $C_{10}H_{18}O$ obtained from it by the action of nascent hydrogen is a colourless liquid with a fruity odour, b.p. 98–102°C. under 4 mm.; its phenylurethane melts at 100–101°C. Gingergrass oil also contains inactive carvone, geraniol, and dihydro-cuminalic alcohol. (See also *Year-Book*, **1904**, 93.)

Glucosides Hydrolized by Emulsin. M. Harlay. (*Journ. Pharm. Chim.* [6], **23**, 157.) In addition to the plants already shown to contain glucosides, which are hydrolized by emulsin, when tested by the method of Bourquelot, the following species have given positive reactions: *Digitalis purpurea*, *Dipsacus pilosus*, *Verbascum thapsus* and *Valeriana officinalis*, in all cases in the roots.

Glycerin, Direct Determination of. — Shukow and — Schestakoff. (*Zeits. für angew. Chem.* through *Repertoire* [3], **17**, 506.) If the solution is alkaline, it is neutralized with H_2SO_4; if acid, with KOH, and concentrated at a temperature not exceeding 60°C. to a syrup. An amount of the residue, not containing much more than 1 Gm. of glycerin, is then weighed off and intimately mixed with anhydrous Na_2SO_4. The powder thus obtained is extracted for 2 hours in a Soxhlet with anhydrous acetone, recently distilled over dried K_2CO_3. The acetone is then distilled off and the residue, dried to constant weight at 70–80°C., weighed. If any drops appear on the surface of the glycerin, these may be removed by washing with petroleum ether. Solutions containing more than 40 per cent. of glycerin cannot be concentrated by evaporation; they are treated directly with the anhydrous Na_2SO_4.

Grindelia, Constituents of. F. B. Power and F. Tutin. (*Proc. Amer. Pharm. Assoc.*, **1905**, 200.) The chief constituents of *Grindelia* are amorphous resins, of which the drug examined yielded 21·6 per cent. soluble in alcohol and insoluble in water. When extracted with petroleum ether, a soft sticky solid was obtained, which evolved NH_3 on heating with alcoholic KOH. The alkaline liquid yielded to ether, hentriacontane $C_{31}H_{64}$, and a crystalline physosterol,

$C_{26}H_{44}O$, or a lower homologue, m.p. 166°C. On acidifying this alkaline liquid, formic and acetic acids were obtained, with higher fatty acids. The ether extract was an amorphous dark resin. It yielded formic, acetic and higher acids when fused with KOH, also a crystalline compound, m.p. 194°C., probably a compound of protocatechuic and para-oxybenzoic acids. The alcohol extract was small in quantity, dark-coloured and amorphous. The drug also contained lævo-glucose, amorphous colouring matter, and tannin with a trace of essential oil. Neither a saponin nor an alkaloid was detected. (See *Year-Books*, **1889,** 151 ; **1893,** 144.)

Guaiacum Resin, New Constituent of. P. Richter. (*Archiv. der Pharm.*, **244,** 90.) When a benzol solution of guaiaconic acid is allowed to evaporate slowly, crystals are formed, which are distinct from the original substance. These have the composition $C_{21}H_{26}O_5$, m.p. 127°C, and yield no blue colour with oxidizing agents. This body has been named β-guaiaconic acid. The acid remaining in solution is α-guaiaconic acid $C_{22}H_{24}O_6$, m.p. 101°C., which is readily affected by oxidizing agents forming guaiacum-blue, the chloroformic solution of which leaves on evaporation, a deep blue residue with a metallic lustre. On treating this with reducing agents, α-guaiaconic acid is again generated.

Gynocardia odorata Seeds, Constituents of. F. B. Power and M. Barrowcliff. (*Proc. Chem. Soc.*, **21,** 176.) It has previously (*Year-Book*, **1904,** 48, 98) been shown that the chaulmoogra oil of commerce is not derived from *Gynocardia* seeds, but from those of *Taraktogenos kurzii*. True *Gynocardia odorata* seeds yield 19·5 per cent. of fatty oil on expression, and 27·2 on extraction with ether. The yellow oil has an odour resembling that of linseed oil. Sp. gr. at 25°C., 0·925 ; acid value, 4·9 ; saponification value, 197 ; Huebl value, 152·8 ; it consists chiefly of the glycerides of linolic acid or its isomers, with those of palmitic linolenic, iso-linolenic, and oleic acids, the last in small quantity only.

Honduras Balsam. A. Tschirch. (*Schweiz. Woch.*, **43,** 238.) The so-called Honduras balsam is closely related to storax ; it contains free cinnamic acid, a solid resin ester and a mixture of liquid resin esters of that acid, and a colourless solid resin-alcohol

resembling storesinol. This may be the "white Peru balsam" previously examined by Thoms and Biltz; if so, the latter cannot be genuine, since it would then contain coumarin but no cinnamic acid.

Hordenine, a New Alkaloid from Malt Culms. E. Léger. (*Journ. Pharm. Chim.* [6], 23, 177.) The culms of malted barley, separated by sifting after drying, are found to contain a new alkaloid, hordenine, $C_{10}H_{15}NO$; m.p. 117·8°C. It crystallizes from alcohol in fair-sized ortho-rhombic, bi refringent, colourless and almost tasteless prisms. Its solutions are devoid of optical activity. It is a powerful base, displacing ammonia from its salts; it is also a powerful reducing agent. Although it is isomeric with ephedrine, it is a tertiary not a secondary base and is mono-acid, forming only one series of salts. It is readily soluble in alcohol, ether, and chloroform; less so in benzol. It dissolves readily in hot CCl_4, from which it crystallizes on cooling, if the sides of the containing vessel be rubbed with a glass rod. It readily forms salts which crystallize easily from aqueous solution, except the hydrochloride, which is very soluble in water. It forms a syrupy non-crystalline acetyl compound. Its iodo-methylate $C_{10}H_{15}NO.CH_3I$ crystallizes from water in dull white anhydrous prisms.

Hydrocyanic Acid, Modification of Liebig's and Fordos and Gélis' Method for the Determination of. G. Guerin. (*Journ. Pharm. Chim.* [6], 22, 433.) In either case, the modification consists in addition of a 3 per cent. solution of borax to the liquid before titration. In *Liebig's method* this borax solution is used in excess instead of alkali, titration being performed in the usual manner to the production of a permanent turbidity. The reaction takes place according to the equation—

$$2HCN + Na_2B_4O_7 = H_2B_4O_7 + 2NaCN$$
$$2NaCN + AgNO_3 = AgCN.NaCN + NaNO_3$$

and

$$AgCN.NaCN + AgNO_3 = 2AgCN + NaNO_3$$

Therefore, in a solution containing 3·148 Gm. of $AgNO_3$ in 1000 c.c., each c.c. = 0·001 Gm. of HCN. All trace of ammoniacal salts must be avoided; but this difficulty may be overcome by

adding 10 c.c. of saturated solution of boric acid to the liquid before titration.

In the *iodometric method of Fordos and Gélis*, an equal volume of the borax solution is added to the liquid to be titrated. This is performed with a solution of 9·407 Gm. of iodine in 1000 c.c., dissolved by means of 16 to 18 Gm. of KI. Each c.c. of this solution is equivalent to 0·001 Gm. HCN, according to the equation—

$$2HCN + 2I_2 = 2CNI + 2HI$$
$$2HI + Na_2B_4O_7 = H_2B_4O_7 + 2NaI$$

The end reaction is very sharp, 1 drop of the standard iodine solution giving a yellow tint, but with cherry-laurel water the colour towards the end of the reaction disappears less rapidly than with pure aqueous solutions of HCN; but it vanishes rapidly on agitation. The benzaldehyde present has no effect, nor do ammoniacal salts interfere, but it is a useful precaution to saturate the liquid with boric acid before titrating. Either method serves well for the standardization of cherry laurel or bitter almond waters.

Hydrogen Peroxide, Testing, for Medicinal Use. O. Schmatolla. (*Pharm. Zeit.*, **50**, 641.) The *acidity* of the sample may be easily determined with Congo red as indicator. Ten c.c. treated with 3 or 4 drops of a 1 per cent. solution of that indicator should be coloured red by the addition of 10 drops of Ca2OH solution, equivalent in alkalinity to 0·25 c.c. of N 10 KOH.

The presence of *hydrochloric acid* renders H_2O_2 solution quite unsuited for medicinal use, since it then contains free Cl [and occasions irritation, especially when employed in the ear.—Ed. *Y.B.*]. To determine the amount of this impurity, 10 c.c. of the H_2O_2 solution is treated with 25 drops of dilute H_2SO_4, 0·05 Gm. of $FeSO_4$, and 5 c.c. of N/10$AgNO_3$. The excess of $AgNO_3$ is then titrated with N/10AmCNS solution; not less than 4·6 c.c. should be required to produce a persistent red colour.

The following is a very delicate reaction for the presence of H_2O_2. To 200 c.c. of water, containing traces of H_2O_2, 5 to 10 drops of dilute H_2SO_4 and 5 to 10 drops of 1 per cent. solution of Co2NO_3 are added. On adding KOH solution drop by drop a very distinct brown colour is produced, even with 0·001 Gm. of H_2O_2 in 1 litre of H_2O.

Hydrogen Peroxide, Valuation of, Approximate J. A. Hughes. (*Chem. and Drugg.*, **68**, 211.) A solution of $KMnO_4$ 5·62 Gm. to 1000 c.c., or, roughly, 10 grains in 4 fl. oz., is made. Each volume of this is equivalent to 1 volume of oxygen. One fluid drachm of the hydrogen peroxide is treated with an equal volume of dilute sulphuric acid, and sufficient of the permanganate solution is then slowly added until a permanent pink colour is obtained. The number of drachms of permanganate used up gives the strength of the peroxide in "volumes." Thus 1 drachm of "10 volume" H_2O_2 should use up 10 drachms of the $KMnO_4$ solution.

Iodine Cyanide, Detection and Determination of, in Iodine. — Milbauer and — Hac. (*Pharm. Centralh.*, **47**, 319.) The iodine is rubbed down with strong H_2SO_4 and transferred with more of the acid to a Kjeldahl flask. The mixture is then diluted with an equal volume of water and gently warmed to volatilize the iodine. The residue is then treated by the usual Kjeldahl process, to convert the nitrogen into ammonium sulphate, and the distillate tested for ammonia with Nessler's reagent. The method is performed quantitatively with a known weight of iodine, by the usual process for the determination of nitrogen, by the Kjeldahl method.

Japan Lac, Constituents of. A. Tschirch and A. B. Stevens. (*Archiv. der Pharm.*, **243**, 504.) The irritant vesicating body, verniciferol, of Japan lac is not, as previously stated, volatile. It has not been isolated in a pure condition, but as an oily liquid; a minute particle coming into contact with the skin causes intense irritation and inflammation. In addition to this, the lac consists of an unoxidized resin, urushin, and its oxidation product, oxyurushin; the resins isolated by treating the lac *in vacuo* with alcohol, and extracting the alcoholic residue with ether, invariably give oxyurushin as a final product. Urushin and oxyurushin are peculiar for containing nitrogen, the formula $C_{102}H_{138}N_2O_{19}$ being attributed to the latter. Gum, and a peculiar enzyme, lacgummase, are also present in the lac, but could not be isolated in a pure condition. The properties of the lac of drying to a black hard varnish are due to the action of the lacgummase on the urushin. If the lac be first sterilized by heat, so as to destroy the ferment, its drying properties are greatly impaired. The so-called urushinic or laccic acid of

Yoshida and the laccol of Bertrand are shown to be mixtures of urushin and oxyurushin. Verniciferol is apparently closely related to toxicodendrol and cardol. Any particles of lac coming in contact with the skin should be at once removed by means of benzene or petroleum.

Jasminium nudiflorum, New Glucoside in. — Vintilesco. (*Journ. Pharm. Chim.* [6], **23**, 305.) A new glucoside, jasminiflorin, has been detected by Bourquelot's method in the fresh shoots of *Jasminium nudiflorum*. It is a crystalline body, and has the a_D—37°C.

Juniperus phœnica, Essential Oil of. J. C. Umney and C. T. Bennett. (*Pharm. Journ.* [4], **21**, 827.) The essential oil of *Juniperus phœnica*, the source of a large proportion of "French oil of savin," is shown to differ widely in characters and constituents from true savin oil from *Juniperus sabina*.

Ketones and Aldehyde, Detection of, in Spirit. — Kutscheroff. (*Pharm. Centralh.*, **47**, 317.) Vanillin 0·3 Gm. is dissolved in 5 c.c. of the alcohol and treated with 1 c.c. of strong H_2SO_4. According to the purity of the alcohol, a more or less intense yellow colour will be developed. If the spirit contain 1 per cent. of ketone a deep colour is given; with acetone a carmine red tint, with other ketones a blue colour is developed, occasionally with a green shade due to methylbutyl ketone; these ultimately disappear. On adding water to the carmine red solution due to acetone, it changes to yellow. The blue tint of the higher ketones remains unaffected, and even becomes deeper on standing, becoming yellow on the addition of alkali. The test may be used quantitatively by the colorimetric method. If the spirit contains aldehyde, a blue colour is obtained, so that this impurity must be removed by distillation.

Kino from Croton Tiglium. D. Hooper. (*Pharm. Journ.*, **21**, 479.) The kino examined was black, with garnet-coloured edges to the fracture, astringent in taste, and giving acid solutions with water and alcohol. It contained 65 per cent. of tannin and 6·8 per cent. of insoluble tannins. In reactions, croton kino resembles that of Malabar.

Kolatin, a New Glucoside from Kola Nuts. — Goris. (*Bull. comm.*, **33**, 563.) Fresh kola nuts contain, besides the

kolanin of Knebel (*Year-Book*, **1892,** 161), 0·3 to 0·4 per cent. of another glucoside which forms white acicular prisms, m.p. 150°C. It is fairly soluble in water, and in other solvents, but almost insoluble in $CHCl_3$. When hydrolized, it splits up into glucose and a body with phenolic characters.

Lac, the Commercial Grades of, and their Valuation. J. C. Umney. (*Pharm. Journ.* [4], **21,** 653.) The varieties and relative commercial value of lacs are fully described, and chemical tests for purity are given. Of these, the Huebl iodine absorption test is considered to be most satisfactory, the standard iodine value being taken as 10. Bleached shellac is also alluded to.

Lac Industry of India. Sir George Watt. (*Pharm. Journ.* [4], **21,** 646.) In a lecture on "A Stick of Sealing Wax," an exhaustive account of the Indian lac industry was given, dealing with the history, production, manufacture, uses, and trade.

Laurus nobilis Leaves, New Constituents in the Essential Oil of. (*Schimmels' Report, May*, **1906,** 43.) Linalol and methyl-eugenol ester have been added to the constituents of oil of bay-laurel leaves. (See *Year-Books*, **1892,** 172; **1889,** 187; **1904,** 107.

Lavandula stœchas, Essential Oil of. (*Schimmels' Report, November*, **1905,** 40.) The dried flowers yielded 0·755 per cent. of yellowish-brown oil, with a strong camphoraceous odour. Sp. gr. at 15°C. 0·962; $\alpha_D + 35°\ 30'$; $\eta_{D20°}$ 1·47909; acid value, 5·16; ester value, 13·1; solubility in alcohol, 70 per cent., 1 : 2 and more. The oil contains a dextrorotatory camphor, m.p. 175°—175·5°C., which formed an oxime, m.p. 117°—118°C., and a semicarbazone, m.p. 231°C.

Lemon, Essential Oil of, Californian. (*Schimmels' Report, November*, **1905,** 28.) A specimen of hand-pressed lemon oil from California, having a good odour, but being slightly darker than Sicilian oil, was found to have the following characters: Sp. gr. at 15°C. 0·8598; $\alpha_D + 53°\ 56'$; α_D of first 10 per cent. of distillate, b.p. 165°—175°C. $+ 48°\ 52'$; η_D 1·47490; residue on evaporation, 3·6 per cent.

Lemongrass Oil, Ceylon. C. E. Sage. (*Chem. and Drugg.*, **68,** 355.) The pure oil distilled at the Government experimental

station at Peradeniya had the sp. gr. 0·899 at. 15·5°C. ; a_D—0·2 ; and contained 66·5 per cent. of citral, but would not yield a clear solution with 70, 80 or 90 per cent. alcohol, thus differing from Indian commercial lemongrass oil, which is expected to be soluble in alcohol 70 per cent.

Lemongrass, Essential Oil of, Adulterated with Coconut Fat. (*Schimmels' Report, November,* **1905,** 44.) Coconut fat has been detected as an adulterant in 2 samples of oil of lemongrass, which gave 15 and 10 per cent. respectively of non-volatile residue.

Lemongrass, Essential Oil of, New Aldehyde in. (*Schimmels' Report, November,* **1905,** 45.) A new aldehyde of the generic formula $C_{10}H_{16}O$ has been isolated in small quantity from lemongrass oil. When liberated from the bisulphite compound and purified by repeated fractionation, it boiled at 68°C. under 6 mm. pressure ; sp. gr. 0·9081 at 15°C. $a_D + 0° 50'$; η_D 1·45641. It forms a semicarbazone with the m.p. 188–189°C.

Licorice, Commercial, Stick. H. W. Noble. (*Pharm. Journ.* [4], **22,** 495.) The results of the examination of commercial samples are given in the following tables :—

Stick Licorice.

No.	Moisture at 212°.	Ash.	Glycyrrhizin.	Insol. in Cold Water.	Insol. Residue.
	Per cent.	Per cent.	Per cent.	Per cent.	
1	13·71	3·87	4·93	22·5	Starch with very little tissue
2	13·05	4·32	5·23	30·47	Starch and woody tissue.
3	13·82	6·30	5·40	20·0	,, ,, ,,
4	13·24	7·22	5·50	19·0	,, ,, ,,
5	13·38	6·00	5·92	25·76	,, ,, ,,
6	12·67	4·80	10·26	22·0	Adulterated, very little tissue
7	13·88	6·64	4·24	21·0	Starch and woody tissue
8	12·24	5·72	5·28	27·3	,, ,, ,,

Licorice Extract, B.P.

No.	Moisture at 212°.	Ash.	Glycyrrhizin.	Insol. in Cold Water.	Insol. Residue.
	Per cent.	Per cent.	Per cent.	Per cent.	
	20·5	5·85	5·67	0·06	practically nil

BLOCK JUICE.

No.	Moisture at 212°.	Ash	Glycyrrhizin.	Insol. in Cold Water	Insol. Residue
	Per cent.	Per cent.	Per cent.	Per cent.	
1	20·53	6·46	17·07	6·86	Starch
2	19·20	6·23	14·08	13·25	„

The method of Hafner (*Year-Book*, **1900,** 194) was employed for the determination of the glycyrrhizin.

Lignaloe, Essential Oil of, Dextrorotatory. (*Schimmels' Report, November*, **1905,** 47.) The occurrence of genuine lignaloe oil with a dextro-rotation (*Year-Book*, **1905,** 107) is confirmed by the arrival of two specimens, from different sources, having the respective rotations $\alpha_D + 6°\ 3'$ and $\alpha_D + 8°$. The main constituent in each was dextrolinalol. The terpineol present was lævoterpineol, whereas that of ordinary lavorotatory lignaloe oil is dextroterpineol. The other constituents in the two forms of oil were identical. Nerol was present in the dextrogyre oil and probably in the other variety also.

Liverworts, Essential Oils from. K. Muller. (*Zeits. für Physiol. Chem.* through *Journ. Pharm. Chim.* [6] **22,** 555.) *Mastigobryum trilobatum* gives an orange yellow essential oil on steam distilling the dry plant ; it has a strong persistent odour, somewhat like sandal wood or cedar oils ; sp. gr. 0·978 at 12°C. ; $\alpha_D + 12°\ 88'$; saponification value 5·4. The chief fraction boils between 260–265°C., to this the author attributes the formula $C_{10}H_{16}$. [The high b.p. would more likely indicate a sesquiterpene.—ED. *Year-Book.*]

Leioscyphus taylori yields a thick, green essential oil, with a strong persistent odour and a disagreeable taste. Sp. gr at 20°C. 0·982 ; $\alpha_D - 3°\ 44'$. It consists chiefly of two sesquiterpene alcohols, $C_{15}H_{26}O$, one boiling at 265°C., the other at 275°C.

Madotheca levigata oil is orange yellow ; sp. gr. 0·856 at 16°C. ; $\alpha_D + 72°\ 74'$; saponification value, 5·56. Its constituents have not been determined.

Alicularia scalaris affords a lemon yellow oil with an odour similar to the other liverwort oils. Its sp. gr. at 15°C. is 0·965 ; $\alpha_D + 33°\ 49'$. It probably consists chiefly of a sequiterpene alcohol $C_{15}H_{26}O$.

Lycopodium, Adulteration of. (*Gehe and Co.'s Report, Pharm. Zeit.*, **51,** 402.) In addition to other recorded adulterants, pine tree pollen and starch, slightly roasted and tinted with methyl orange have been met with. In the latter case the colouring matter is soluble in alcohol. C. Gallois (*Journ. Pharm. Chim.*, [6], **23,** 242) records another adulterant, obtained by the action on anhydrous ammonia on Austrian galipot resin heated to near its melting point. This product, when powdered, is of a deeper colour than the genuine drug, it flashes in the flame, and is similar to lycopodium in its behaviour to water, but is partially soluble in alcohol giving a pale yellow solution, and is partially dissolved by Et_2O and by $CHCl_3$. Under the microscope the appearance of the irregular transparent grains with rounded angles is quite distinct from that of the true spores of the clubmoss.

Mace, Distinction of Bombay and Banda. M. Utz. (*Pharm. Zeit.*, **50,** 845). Pritchard's test, which consists in treating the mace with a 1 per cent. solution of NaOH will distinguish Bombay from Banda mace. The former gives a red colour, but the latter is unaffected. The method of Busse of applying this test is recommended. Filter paper moistened with the alkaline extract of the mace is dried; that of Bombay mace will be of a deep orange tint, but that of Banda mace remains colourless. By this means the admixture of 5 per cent. of Bombay mace with the Banda variety may be detected. (See also *Year-Book*, **1903,** 223.)

Magnesium, Modification of Schlagdenhaufen's Test for. L. Grimbert. (*Journ. Pharm. Chim.* [6], **23,** 237.) Instead of employing the unstable hypoiodate reagent as proposed by Schlagdenhaufen, the following method of procedure is followed for the detection of magnesium. To 10 c.c. of the liquid to be examined 5 c.c. of 10 per cent. KI solution is added, followed by 2 or 3 drops of strong chlorinated soda solution. In the presence of magnesium a brown flocculent precipitate, resembling Fe_26HO will be obtained. The reaction is very distinct with 1 : 2000 of magnesium. The liquid to be tested must be neutral or faintly alkaline, as the least trace of free acid prevents the formation of the precipitate.

Male Fern Extract, Determination of Crude Filicin in. (*Caesar and Loretz's Report*, September, **1905,** 85.) Five Gm. of the

extract is dissolved in 30 Gm. of ether in a flask and treated with 100 Gm. of freshly prepared 3 per cent. Ba2OH solution, the mixture being thoroughly shaken up in a separator for a few minutes. After separation, 86 Gm. of the clear aqueous liquid (=4 Gm. of the original extract) is withdrawn, treated with 2 Gm. of HCl 25 per cent., and then shaken out with 25, 15, and 10 c.c. of ether, each ethereal solution being filtered through the same double filter into a tared flask. The ether is then distilled off and the residue weighed after dry at 100°C. to constancy. The weight × 25 gives the percentage of crude filicin in the extract.

Mandarin Orange, Essential Oil of. E. Berté and S. Gulli. (*Chem. and Drugg.*, **67,** 445.) The species of orange from which the oil is obtained are stated to be *Citrus madurensis*, *C. deliciosa* and *C. bigaradia sinensis*. One thousand fruits yield about 400 Gm. of oil with the sp. gr. at 15°C. 0·854 to 0·858, α_D +67° to +73°. On account of its value the oil is frequently adulterated with lemon, sweet orange and bitter orange oils. When the pure oil is submitted to distillation and the first 50 per cent. has distilled, the distillate shows a rotation 3° to 3° 10′ higher than the original oil; while the residue is correspondingly lower in rotation. With adulterated oil the distillate is only 1° 30′ to 2° 45′ higher in rotation, and the residue 1° 20′ to 3° 58′ lower than the original oil. (See also *Year-Books*, **1898,** 189; **1901,** 95.)

Margarine, Detection of, in Butter. Sprinkmeyer and Wagner. (*Pharm. Zeit.* **50,** 845.) The test is based on Baudouin's reaction for sesame oil, which is a constituent of margarine. Fifty to 100 Gm. of the butter is melted and shaken out with several successive washings of 20 c.c. of glacial acetic acid; the bulked acid extracts are evaporated on the water bath, and the residue is saponified with 5 c.c. of saturated Ba2OH solution and 10 c.c. of alcohol. The soap formed is evaporated to dryness on the water bath; the dry residue is finely powdered and extracted with petroleum ether; the petroleum ether extract is evaporated to 1 or 2 c.c. and transferred to a narrow test tube, when it is treated with 1 c.c. of HCl sp. gr. 1·19 and 2 drops of 1 per cent. alcoholic solution of furfural. The production of a red colour indicates the presence of sesame oil and

therefore of margarine. This test will show the presence of 1 per cent. of margarine in butter.

Meconic Acid in the Assay of Opium. E. Mallinckrodt, Junr., and E. A. Dunlop. (*Journ. Amer. Chem. Soc.*, **27,** 946; *Pharm. Journ.* [4], **21,** 473.) In the process of the U.S.P. **1890** for the assay of opium, the formation of a scaly precipitate of calcium ammonium meconate, $CaNH_4C_4H_7HO_7+2H_2O$ or with $3H_2O$ is noted. The presence of this salt will vitiate the results on determining the morphine in the precipitate by titration with acid, since it consumes nearly 0·25 as much acid as morphine itself. The results will consequently be too high. Various salts of meconic acid are described.

Meconic Acid in the Assay of Opium. D. B. Dott. (*Pharm. Journ.* [4], **21,** 548.) It is pointed out that the tribasic properties of meconic acid are well known, and that Kebler demonstrated the occurrence of the acid in the morphine precipitate in 1895 (*Year-Book*, **1896,** 140), and the fact that the basic calcium meconate so present neutralizes acid was shown by the author (*Journ. Soc. Chem. Ind.*, **15,** 93). The use of ammonium oxalate to prevent the formation of this salt was then recommended.

Melissa calamintha, Essential Oil of. (*Schimmels' Report*, Nov., **1905,** 34.) The oil of the herb cultivated at Miltitz had the following characters: sp. gr. at 15°C. 0·8771 $a_D+16°\ 57'$; $\eta_{D\,20°}$ 1·49110; acid value, 0; ester value, 8·3; acetyl value, 30·65. The odour of the oil is pleasant and aromatic. (See also *Year-Book*, **1901,** 80.)

Mercurous Chloride, New Crystalline Modification of. J. Meyer. (*Zeits. anorgan. Chem.* through *Journ. Soc. Chem. Ind.*, **24,** 1,254.) On adding $HgCl_2$ solution to a solution of Li_2SO_3 a precipitate of ordinary calomel is formed; if this be filtered out and the filtrate heated gradually to 70°C. a further separation of HgCl in the form of shining plates occurs. When dry they are light and bulky compared with ordinary calomel (sp. gr. 4·5 to 5 compared with 6·5 to 7). This is not an allotropic form of calomel, but merely a different physical condition. It resembles the Japanese calomel described by Lunge and Divers.

Mercury Oxycyanide. K. Holdermann. (*Archiv. der Pharm.*, **243,** 553.) The author confirms the fact that the so-

called oxycyanide of mercury of commerce is merely mercuric cyanide $Hg(CN)_2$ (*Year-Book*, **1903,** 115). Only one oxycyanide of mercury is obtainable, by whatever process is employed; this has the formula $HgO.Hg(CN)_2$, thus confirming the statements of Richard (*loc. cit.*). It is best obtained by rubbing down 13·5 Gm. of $Hg(CN)_2$ with 11·5 Gm. of yellow HgO, the mixture is transferred to a small flask, treated with a little water, and heated for 4 hours on the water bath, under a reflux condenser, until combination is complete; 500 c.c. of water is then added and the mixture is boiled until it loses its granular appearance. It is then filtered while hot. On cooling, the oxycyanide is thrown down. The yield is 19·9 Gm. It forms a white crystalline powder; solubility in water 1·35 : 100, more soluble on warming with partial decomposition. The amount of mercuric oxide in a specimen of this salt is readily determined by simple titration with $N/_{10}HCl$ solution in the presence of a considerable amount of NaCl, using methyl-orange indicator. One c.c. of acid is equivalent to 0·0234 Gm. of $HgO.Hg(CN)_2$.

Metapilocarpine. A. Pinner. (*Berichte*, **38,** 2,560.) When pilocarpine hydrochloride is heated above 200°C. for 15 minutes, and the base is liberated with K_2CO_3 solution, iso-pilocarpine is formed. If, however, the heat be maintained at 225–250° for 1 or 2 hours, the product on liberating the bases is chiefly metapilocarpine $C_{11}H_{16}N_2O_2{\cdot}H_2O$, which is insoluble in $CHCl_3$. Its salts are more soluble than those of pilocarpine and iso-pilocarpine. It is readily hydrolized by boiling KOH and loses only one N-atom, yielding acids containing nitrogen.

Morphine, Colorimetric Determination of, in Toxicology, L. George and — Gascard. (*Journ. Pharm. Chim.* [6], **23,** 513.) The alkaloidal residue of morphine obtained by the Stas-Otto method employing amylic alcohol or chloroform as the solvent cannot be weighed on account of the minute quantity generally obtainable, which, moreover, is not sufficiently pure. It may, however, be quantitatively measured by means of the following colour tests with iodic acid. The necessary solutions are :—(A) Standard solution of morphine hydrochloride containing 1·256 Gm. in the litre; 1 c.c. of this is equivalent to 1 Mgm. of monohydrated morphine $C_{17}H_{19}NO_3.H_2O$. (B) A 5 per cent solution of iodic acid. (C) A 5 per cent. solution of ammonia. The solution to be tested is made neutral, or faintly acid, and

treated with the iodic acid reagent; it is then rendered faintly alkaline with ammonia, which causes the original yellowish tint to change to brown. This is then matched with the standard solution, in known dilution, preferably with a colorimeter or with twin tubes, as in "Nesslerizing."

Morphine Precipitation Bottle. H. Gardner. (*Pharm. Journ.* [4], **22,** 548.) A bottle for the precipitation of morphine in the official process of opium assay is figured and described.

Morphine, Toxicological Detection of. E. Gérard, C. Delearde and — Ricquet. (*Journ. Pharm. Chim.* [6], **22,** 49.) The organs are pulped and mixed with an equal weight of water, then acidified with HCl in the proportion of 1 to 9 of the mixture; in the case of urine, this is similarly acidified. The mixture is then digested on the water bath for 2 hours; it is rendered alkaline with ammonia, and extracted with 2 or 3 successive portions of amylic alcohol saturated with ammonia. These amylic extracts are set aside; the aqueous mixture is evaporated on the water bath and rubbed down with sand. This is again extracted with ammoniacal amyl alcohol. All the amyl alcohol extracts are then bulked and shaken out with water acidified with HCl. The acid liquids are separated, bulked, rendered alkaline with AmOH and again shaken out with several successive washings of ammoniated amyl alcohol. The bulked amylic extracts are distilled, and the residue tested with Marquis's reagent, a mixture of 30 c.c. of strong H_2SO_4 and 20 drops of formalin. Morphine gives, when the amylic alcohol solution is spotted out on porcelain, a deep violet colour reaction with the reagent; oxymorphine, a fine bright green. When both morphine and oxymorphine are present, both violet and green streaks of colour are obtained. (See also *Year-Book*, **1900,** 102.) The failure to detect the base by means of Stas-Otto's and other methods is attributed to the formation of oxymorphine and of morphine-sulphonic acid. By the above method evidence of the presence of morphine and oxymorphine was obtained from the organs and urine of a rabbit, to which 0·010 Gm. of the hydrochloride had been administered hypodermically 6 hours before death. The liver and kidneys, as well as the urine, are the most important organs to employ for the detection of the poison.

Musk, a New Ketone, Muskone, the Odorous Principle of. (*Schimmels' Report, May*, 1906, 94.) The agreeable odour of musk is found to be due to the presence of a ketone, muskone $C_{16}H_{30}O$ or $C_{15}H_{28}O$. It was isolated by submitting musk to prolonged steam distillation, when a variable quantity from 2·07 to 0·5 per cent. of dark brown volatile oil was obtained on shaking out the aqueous distillate with ether, and evaporating the solvent. Fatty acids and fat were removed by saponification, and subsequent washing; the insoluble portion was then fractionated at 2 mm. pressure. In this manner the ketone was obtained as a colourless viscous oil, b.p. 142–143° under 2 mm., 327–330°C. under 752 mm. Sp. gr. 0·9268 at 15; α_D—10° 6′ $\eta_{D25}{}^{\circ}$ 1·47900. It has a pure, intense odour of musk. It forms a crystalline semicarbazone, m.p. 133–134°C. in fine white prisms, which are absolutely odourless. But if a trace be heated with dilute H_2SO_4 a powerful musk odour is developed by the liberated ketone. The other odorous bodies present in musk are unpleasant smelling and impair the odour of the ketone.

Myrrh, Constituents of. A. Tschirch and — Bergmann. (*Archiv. der Pharm.*, 243, 641.) Herabol Myrrh, from a species of *Commiphora*, contains 6 to 7 per cent. of thick honey-like essential oil, sp. gr. 1·046; 28 to 30 per cent. of resinous matter soluble in alcohol; and 61 per cent. of gum and enzyme, soluble in water. The alcohol soluble resins are separable into α- and β-herabomyrrholol, α- and β-herabomyrrhol and heraboresene. All these are amorphous.

Nitroglycerin, Detection and Determination of, in Pharmaceutical Preparations. — Binz. (*Svensk Farm.*, through *Apoth. Zeit.*, 21, 204.) To detect nitroglycerin in pastilles, these are powdered and extracted in a Soxhlet with ether. The solvent is distilled off, and the fatty residue extracted with alcohol. After filtering, the alcohol is evaporated and a portion of the residue is saponified with alcoholic KOH, and tested in the usual manner for nitric acid with $FeSO_4$ and H_2SO_4. Another portion of the original alcoholic residue is treated with a drop of aniline and strong H_2SO_4. In the presence of nitroglycerin a red colour is obtained, changing to green on dilution with water. To determine the amount of nitroglycerin quantitatively, 100 pastilles are powdered and extracted as above. After distilling off the ether the residue is saponified with alcoholic KOH, then

treated with nascent hydrogen derived from zinc and H_2SO_4, which fixes the nitrogen as $(NH_4)_2SO_4$. The liquid is transferred to a distilling flask, made alkaline, and the liberated NH_3 distilled into a receiver containing HCl. The amount of NH_4Cl in this distillate is then found by the usual gravimetric method with $PtCl_4$. From this, the amount of nitroglycerin in the pastilles is calculated.

Nux Vomica Extract, Analysis of. W. H. Lenton. (*Pharm. Journ.* [4], **21,** 864.) A modification of Bird's process (*Year-Book*, **1901,** 93), applicable to the powdered form of nux vomica extract, is described in detail.

Nux Vomica Fat. J. F. Harvey and J. M. Wilkie. (*Journ. Soc. Chem. Ind.*, **24,** 718.) Nux vomica seeds contain about 4 per cent. of fat of varying consistence, with yellowish brown colour, a peculiar odour and a nauseous but not bitter taste. The amount of free acid in 3 samples varied very widely from 6·9 to 56·7 per cent. calculated as oleic acid ; the unsaponifiable matter amounts to about 12 per cent. This is an amorphous yellow, waxy viscid substance resembling woolfat in appearance. Its iodine value is above that of the cholesterols, although it affords some of the cholesterol colour reactions. A table of the general characters of the fat is given.

Ocotea usambarensis, Essential Oil of. R. Schmidt and K. Wellinger. (*Berichte*, **39,** 652.) The oil of the bark of the Lauraceous tree *Ocotea usambarensis* from East Africa is a thin, powerfully odorous, yellowish liquid, sp. gr. 0·913 at 20°C. It contains about 40 per cent. of cineol, 40 per cent. of lævo-terpineol ; 10 per cent. of sesquiterpene, 1 per cent. of myristic aldehyde, 4 per cent. of esters, and traces of ketone with a little terpene.

Olive Oil Extracted with Carbon Disulphide, Distinction of, from Expressed Olive Oil. G. Halphen. (*Journ. Pharm. Chim.* [6], **22,** 54.) Fifty c.c. of the oil is heated over a gas flame to 110° C. and saponified with 12 c.c. of a solution of NaOH 100, in water 75. Heating and vigorous stirring are continued until the considerable foaming which occurs ceases, and saponification is complete ; this will be in 7 to 10 minutes, and the temperature will rise to about 160°C. The capsule containing

the soap is then removed from the heat, and stirring continued until the temperature falls to 110°C., 200 c.c. of hot water is then added, and stirring continued until a uniform pasty mass of soap results. One hundred c.c. of saturated solution of Na_2SO_4 is then added; the mixture is well stirred and allowed to become quite cold. It is then treated with 20 c.c. of 1 : 4 solution of $CuSO_4$. The magma is thrown on a filter. If the filtrate be yellow, a trace more of the $CuSO_4$ solution is added and filtration repeated, so as to obtain a clear, greenish filtrate. To 100 c.c. of this greenish liquid 5 c.c. of a reagent composed of $AgNO_3$ solution 1 : 100, one volume, glacial acetic acid 5 volumes, is added and the mixture is heated to boiling; on cooling excess of AmOH is added. If the oil under examination has been extracted with CS_2, a black precipitate or coloration is formed due to the presence of sulphur compounds. The absence of oils from Cruciferous seeds, which contain sulphur compounds, must be assured. Expressed olive oil, being free from sulphur, gives no such black precipitate.

Opium and its Preparations, Morphinometric Assay of. P. Asher. (*Amer. Journ. Pharm.*, **78,** 262.) Place 4 Gm. of dried or powdered opium in a small tared evaporating dish, add 5 c.c. of 5 per cent. KOH solution, mix thoroughly, and evaporate to constant weight on the water bath. Then add 2 Gm. of freshly prepared dry Ca2(OH) and 10 c.c. of distilled water, and triturate for 15 minutes until a perfectly smooth mixture results. Then add 19 c.c. of water, stirring frequently for half an hour, and filter through a dry filter. Transfer exactly 15 c.c. of the filtrate to a 100 c.c. stoppered Erlenmeyer flask, and add to this 4 c.c. of alcohol and 10 c.c. of pure ether; then add 0·5 Gm. of AmCl, and shake well and often during 30 minutes. Set aside (stoppered) in a cool place for 12 hours. Then transfer the ethereal layer to a small funnel containing a pad of asbestos cotton; rinse the flask with 10 c.c. of ether and pour this, as before, into the funnel; when this has passed through, filter the aqueous liquid in the flask through the same funnel. Add 5 c.c. of ether to the flask, rotate gently and pour into the funnel; repeat the process with another 5 c.c. of ether, without trying to remove the adhering crystals. Wash the flask with small portions of morphinated water, using 15 c.c. in all, and pass these washings through the funnel; drain the latter, place it in the flask, raise the asbestos pad and rinse the crystals into

the flask with 12 c.c. of N/10 H_2SO_4. Then transfer the asbestos to the acid solution in the flask, rinse the funnel with water, and when all the crystals have dissolved, titrate the free acid with N/40 KOH solution, with hæmatoxyllin indicator. Divide the number of c.c. of N/40 KOH solution used by 4, subtract this number from the 12 c.c. of N/10 H_2SO_4 originally used. The remainder will be the number of c.c. of N/10 H_2SO_4 solution used up by the morphine. Multiply this number by 1·5046 and add the correction 0·070, and the result is the percentage of morphine.

Assay of Tincture of Opium.—Take 40 c.c. of tincture, add to it 5 c.c. of 5 per cent. KOH solution, in a tared dish and evaporated to about 8 Gm.; add 2 Gm. of fresh, dry Ca2 (OH), and triturate until uniform. Transfer to a graduated cylinder, wash out the dish with water and add this to the rest to obtain in all 30 c.c. If any froth forms, add a few drops of ether to remove it. Add water to make the measure exactly 31 c.c., shake occasionally for half an hour, then filter off exactly 15 c.c., and proceed as directed under opium. The number of c.c. of N/10H_2SO_4 combined with the morphine × 0·15046 + 0·070, gives the weight of morphine in Gms. in 100 c.c. of the tincture.

Opium, Smyrna, "Manipulated." P. Guiges. (*Journ. Pharm. Chim.* [6].) Commenting on the note of Masson (*Year-Book*, **1905,** 206) on this subject, the author states that the drug containing 10 to 12 per cent. of morphine is invariably "manipulated." Natural opium of normal high morphine value is stated to be purchased solely by Great Britain and the United States. Three samples received direct from an opium-producing district, marked "superior," "medium" and "inferior" quality respectively, have been examined with the following percentage results—

Quality.	Moisture.	Ash.	Aqueous Extractive.	Morphine.	Narcotine.
Superior . . .	11·46	4·10	46·48	11·18	1·65
Medium . . .	12·10	3·60	55·98	nil	2·37
Inferior . . .	10·30	6·15	29·78	1·90	1·29

The medium quality was stated by the remitter to be adulterated with apricot pulp; it gave reducing sugars equivalent to 10·25 per cent. of glucose. The "superior" sample gave the equivalent of 8·6 per cent. of glucose. The adulterant in the "inferior"

specimen was apparently coagulated egg albumin. Although opium undergoes an official inspection, this is merely for fiscal purposes, and relates only to the opium before it leaves the producer to the exporter. Subsequently no supervision is exercised, and the exporter may deal with the drug in any manner.

Orange and Lemon Leaves, Essential Oils of. G. Litterer. (*Bull. Soc. Chim.*, **33**, 1079, 1081.) Fresh leaves and stems of *Citrus aurantium* gave an essential oil with the following characters: Sp. gr. 0·8603; $a_D + 56° 46'$; $\eta_{D\ 20°}$ 1·472. The total alcohols present amounted to 20 per cent., among which geraniol was isolated and indications of the presence of dextro-linalol obtained. The oil contains 4 per cent. of citral, also camphene and limonene.

Fresh leaves and twigs of *Citrus limonum* gave an oil having the sp. gr. 0·8824; $a_D = 21° 8'$; $\eta_{D\ 20°}$ 1·1725; the total alcohols amounted to 19·4 per cent., consisting of geraniol and probably dextro-linalol; camphene and limonene were the chief terpenes. The oil contains 24 per cent. of citral.

Orange, Bitter, Adulterated Essential Oil of. (*Schimmels' Report, November*, **1905**, 32.) A sample of bitter orange oil adulterated with resin has been met with, which gave 12·4 per cent. of residue on evaporation. This oil had the sp. gr. at 15°C. 0·8976; $a_D + 79° 35'$.

Oxygen, Rapid and Economical Method for Preparing. E. Bridon. (*Bull. comm.*, **34**, 33.) A few tablets of sodium peroxide, or "oxylith," in a small, flat-bottomed dish or saucer, are stood on the bottom of a large earthen jar with perpendicular sides, such as an extract pot, and covered with a large glass funnel. A rubber tube is attached to the beak of this funnel to serve as a delivery tube. Water is then poured down the outer space, between the sides of the pot and the funnel, in sufficient quantity to just overflow into the saucer containing the peroxide. Gas is at once evolved, and as soon as the air in the funnel is displaced, the oxygen is collected in the usual manner in vessels filled with water. More water is added from time to time, as required. When evolution of gas ceases, the residual oxygen left in the funnel is driven out and collected by filling up the jar with water. The oxygen thus obtained is

practically pure; it may, if required, be rendered quite pure by washing it first with 5 per cent. NaOH solution, then with 1 per cent. $KMnO_4$ solution. As first obtained it is quite free from chlorine compounds, such as are often found in oxygen prepared from $KClO_3$. By this method 30 litres of pure oxygen may be prepared in 10 minutes, at a cost of about 6*d*. The method is specially valuable for the extemporaneous preparation of the gas for medicinal use, since it requires only the simplest apparatus and the product is very pure.

Paraphenylene-diamine, Detection of, in Dyed Hair. E. Erdmann. (*Apoth. Zeit.*, **20,** 716.) Paraphenylene-diamine is found to be highly injurious when applied to the scalp, as before recorded (*Year-Book*, **1905,** 124). Under the name of "ursol" it is largely used for dyeing fur. Its presence on material so dyed may be detected by treating some of the hair with hot HCl 25 per cent., which will dissolve the dye and be coloured brown. On boiling, the solution assumes a cherry-red tint. If filtered and treated with $NaNO_2$ this is changed to brown; on treating this diazo-compound with β-naphthol-disulphonic acid, an intense blue colour is obtained, which dyes filter paper.

Patchouli, Essential Oil of, Improved by Keeping. J. Rodie. (*Schimmels' Report, November*, **1905,** 52.) From observations on three samples, 11, 6 and 1 year old respectively, patchouli oil is found to improve by keeping, becoming more soluble in alcohol 80 per cent. and acquiring a better odour value.

Patchouli, Essential Oil of, Three Varieties of. A. W. K. de Jong. (*Chem. Centralblatt*, **1905, 2,** 1180, through *Schimmels' Report, May*, **1906,** 49.) Three varieties of *Pogostemon* occur in the Botanical Gardens of Buitenzorg, known as "Patchouli fleurissant" (*P. heyneanus*, Bth. ?), "Patchouli de Singapour" (*P. tomentosus*, Hassk ?), and "Patchouli de Java," a variety of the latter. The oils of these differ somewhat, as follows—

"*Patchouli fleurissant*" *Oil.*—Sp. gr. at 25° C. 0·922; a_D—16° 10′; solubility in alcohol, 90 per cent. 1 : 10. On fractionation at 740 mm., this gives 17 per cent. between 130° to 250°C.; 50 per cent. from 250°–270°C.; 16 per cent. from 270° to 280°C.; 10 per cent. from 280° to 300°C.

"*Patchouli de Singapour*" *Oil.* Sp. gr. at 25°C. 0·949; a_D

—51° 24′ ; solubility in 90 per cent. alcohol, 1 : 6. Two per cent. only distils between 230°–250°C. ; 60 per cent. between 250°–270°C. ; 20 per cent. at 270°–280°C. ; and 10 per cent., 280–300°C. "*Patchouli de Java Oil.*" Sp. gr. at 25°C. 0·929 ; α_D 42° 48′ (—42°48′ ?) ; solubility in 90 per cent. alcohol, 4 : 3. At 145°–250°, 10 per cent. distils ; at 250°–270°C., 70 per cent. ; 270°–280°C., 8 per cent. ; 280°–300°C., 6 per cent. The two last oils contained azulene. The portion of the oils unaltered by H_2SO_4 gave, on distilling, a sesquiterpene, which has been named dilimene, b.p. 260–263° at 740 mm.

Pausinystalia trillesii, Yohimbine from. — Dupouy and — Beille. (*Bull. Pharm. de Bordeaux*, **45,** 203.) The bark of *Pausinystalia trillesii*, from the French Congo, is found to contain a base, identical in all its reactions with yohimbine, derived from the nearly allied *P. yohimba*. The small amount of material available has prevented an ultimate analysis of the base.

Pepsin, Assay of, by the Biuret Reaction. W. B. Cowie and W. Dickson. (*Pharm. Journ.* [4], **21,** 221.) A lengthy criticism of the official and other processes is followed by a detailed description of experiments on the colorimetric measurement of the quantity of peptone formed, in digestion experiments, by means of the biuret reaction.

Percolator and Shaking Tube, Combined, for the Assay of Alkaloidal Drugs. H. M. Gordin. (*Proc. Amer. Pharm. Assoc.*, **1905,** 386.) The apparatus described avoids loss on transferring from a shaking vessel to a percolator. A cylindrical tube, 20 cm. long and 2·5 cm. wide, is fitted at one end with a short narrower tube, 1 cm. long and 1·75 cm. wide ; at the other end with another tube, 3 cm. long and 1·25 cm. wide. At the juncture of the second tube, with the body of the apparatus, three indentations are made in the glass. A piece of cotton is placed in a small piece of cheese cloth and pushed up into the narrower short tube, so that it reaches the indentations and plugs that portion of the tube below rather firmly. A pellet of cotton is next pushed up the short tube, and the end of the tube is fitted with a good perforated cork carrying a glass stop cock. After closing this, the drug is weighed off and introduced into the tube, through the upper, wider end ;

the menstruum is added, and the upper narrow tube is closed with a good cork. After shaking for the prescribed time, the tube is stood with the stop-cock downwards and then allowed to macerate, as required. Percolation can then be performed by opening the stop-cock. The above dimensions are suitable for 10 Gm. of such a drug as coca leaves.

Phenacetine, Adulteration of, with Para-chloro-acetanilide. C. Mannich. (*Berichte Pharm.*, through *Journ. Pharm. Chim.* [6], **22**, 391.) A sample of phenacetine, having the abnormal m.p. 119–120°C. instead of 134–135°C., was found to contain 5·89 per cent. of Cl. By treatment with ether and subsequent recrystallization of the ether-soluble portion from boiling water, the impurity was isolated and proved to be para-chloro-acetanilide, C_8H_8ClNO, m.p. 175–177°C., giving a violet-blue coloration when boiled with H_2SO_4. Under similar conditions, pure phenacetine gives a dull red-brown colour. The sample was a mixture of 72 per cent. of phenacetine and 18 per cent. of the impurity.

Phenol, Distinction of, from Cresols. G. Werner. (*Apoth. Zeit.*, **20**, 925.) With Fe_2Cl_6, *ortho-cresol* gives a blue colour, quickly turning green; *phenol* and *meta-cresol* give a violet colour; and *para-cresol*, a blue colour. Aqueous solutions of *phenol* and of *ortho-cresol*, made faintly alkaline with ammonia and boiled, become blue on adding bromine water; *meta-cresol* and *tri-cresol*, under similar conditions, give a bluish-green colour; and *para-cresol* is unaffected. On adding a trace of KNO_2 to a solution of the substance in 3 c.c. of H_2SO_4, *phenol* gives an emerald-green colour, becoming deep blue on standing; *ortho-*, *meta-* and *tri-cresol* give a permanent green; and *para-cresol* a dull red colour. On diluting these with water and adding excess of AmOH, the first three become green, the last yellow. On adding 10 c.c. of KOH solution to a similar volume of the solution to be tested, with 10 c.c. of alcohol and 1 drop of aniline, followed by 5 or 6 drops of H_2O_2 solution, then, after shaking, 12 drops of chlorinated soda solution, *phenol* gives at first a dull red colour, rapidly turning yellow; *meta-* and *tri-cresol* at first show a violet tint, changing to green; *para-cresol* gives a fugitive violet colour. On mixing 2 Gm. of the substance with an equal weight of phthalic acid, followed by 5 drops of H_2SO_4, on warming, *phenol-* and *tri-cresol* give a dull red mass; *ortho-* and *meta-cresol* a cherry red, *para-cresol* an orange red.

On adding water and an excess of NaOH to these mixtures, *phenol* gives a magenta-red colour, *ortho-* and *tri-cresol* a violet red, *meta-cresol* a bluish violet, and *para-cresol* a yellowish tint.

Pinene and Camphene, Action of Mercuric Acetate on. L. Babiano. (*Reale accad. dei Lincei*, through *Journ. Pharm. Chim.* [6], **22**, 397.) *Pinene* is oxidized by an aqueous solution of mercuric acetate, forming $\Delta^6(6)$ oxymenthenone (2). To obtain complete oxidation, 25 Gm. of pinene is left in contact with 174·5 Gm. of mercuric acetate, dissolved in 700 c.c. of water, for 10 to 15 days, with frequent agitation.

Camphene behaves quite differently with the same reagent under similar conditions; it forms the crystalline additive compound $C_{10}H_{16}O{\cdot}2HgC_2H_3O_2$; insoluble in water, alcohol and ether, and therefore easily purified. It regenerates camphene when suspended in water and treated with H_2S.

To detect camphene in an essential oil, a 50 per cent. solution thereof in benzol is shaken with sufficient of a 25 per cent. aqueous solution of mercuric acetate and set aside for 30 days, when the above crystalline compound forms, and is readily collected and purified.

Pinus maritima, Essential Oil of Shoots of. E. Belloni. (*Annuar. del Soc. Chim. di Milan*, through *Schimmels' Report*, *May*, **1906**, 57.) *Fresh shoots* gave 0·618 per cent. of bright green oil; sp. gr. at 15°C. 0·8810; $\alpha_D - 23°\ 46'$; acid value, nil; ester value, 7·9 equivalent to 2·77 per cent. of bornyl acetate.

Dried shoots gave 0·517 per cent. of oil; sp. gr. at 65°C. 0·8963; $\alpha_D - 20°\ 15'$; acid value, 5·43; ester value, 8·27 = 2·92 per cent. of bornyl acetate. The acids consisted chiefly of caprylic acid.

The chief constituent is lævopinene, and probably limonene or dipentene, with borneol.

Pinus montana, Adulterated Essential Oil of. (*Schimmels' Report*, *November*, **1905**, 58.) The large demand and limited supply of essential oil of *Pinus montana* have produced a scarcity. As usual, under these circumstances, adulterated samples have appeared on the market. A case is recorded of sophistication with American turpentine oil. This adulterated oil gave 34 per cent. of a fraction boiling below 160°C. Pure oil gives practically nothing below this temperature.

Pinus pumlio, Styrian, Essential Oil of Leaves of. (*Schimmels' Report, May*, **1906,** 56.) The leaves gave 0·41 per cent. of yellow oil: it began to boil at 170°C. (740 mm.); at 203°, 67 per cent. had distilled. Sp. gr. at 15°C. 0·8685; $\alpha_D - 11°\ 3'$; acid value, 1·4; ester value, 16·8; equivalent to 5·9 per cent. of bornyl acetate; solubility in alcohol 90 per cent., about 1 : 5·5 or more.

Piper volkensii Leaves, Essential Oil of. R. Schmidt and K. Weilinger. (*Berichte*, **39,** 652.) The leaves of *Piper volkensii* yield 0·3 per cent. of light brown oil, with a pleasant and powerful odour; sp. gr., 0·934 at 20°C. It contains about 25 per cent. of limene, 45 per cent. of a body $C_{11}H_{12}O_3$, and an alcohol of the generic formula $C_{10}H_{18}O$, probably citronellol, as an acetic ester.

Piperazine Benzoate and Salicylate. A. Astruc. (*Bull. Soc. Chim.* [3], **35,** 169.) *Piperazine benzoate* $C_4H_{10}N_2 \cdot (C_6H_5 \cdot COOH)_2$ is obtained by dissolving separately two molecular weights of benzoic acid and 1 molecular weight of piperazine in alcohol 90 per cent. On mixing the solutions, a crystalline precipitate is gradually formed, which has the above constitution when dried over H_2SO_4. It forms white brilliant scales having a faint odour and taste of benzoic acid. It volatilizes without melting at 120°C. Solubility in water, 1 : 4·2 at 15°C. The *salicylate* is prepared in a similar manner, and has the formula $C_4H_{10}N_2\ (C_6H_4 \cdot OH \cdot COOH)_2$. It occurs in small, white, odourless needles, volatilizing at 160°C without melting. Its solubility, 1 : 90 of water at 15°C., is much less than that of the benzoate.

Piperazine Monomethylarsinate. A. Astruc. (*Bull. Soc. Chim.*, **35,** 839.) By mixing a cold solution of 1·94 Gm. of piperazine in alcohol 90 per cent. with 2·8 Gm. of monomethylarsinic acid, a crop of fine white needles quickly forms, ultimately resulting in a crystalline mass. When dried, these effloresce at 95–100°C., losing their crystal water, melting with decomposition at about 130°. The salt is soluble: 1 : 1 in water and 1 : 33 in 90 per cent. alcohol. It has the formula

$$\left(As\ O \begin{matrix} OH \\ OH \\ CH_3 \end{matrix} \right)_2 C_4H_{10}N_2 + 2H_2O.$$

Polygonum bistorta, Tannins of. L. Iljin. (*Annales de Pharm.*, **12**, 57.) The root of *Polygonum bistorta* contains two tannins which are extracted by means of alcohol. Both are amorphous, are very soluble in water and in alcohol, and combine with powdered hide, which they colour differently. They are separable by means of alcohol-ether. They differ in their optical activity and in chemical constitution, the formula $C_{38}H_{34}O_{18}$ being attributed to one and $C_{20}H_{20}O_9$ to the other. Both yield gallic acid and phloroglucin when fused with alkali, and give pyrocatechin on destructive distillation. One is allied to the tannin of *Potentilla* and oak-bark, the other resembles that of rhatany.

Pomegranate Bark, Alkaloidal Assay of. (*Caesar and Loretz's Report, September*, **1905**, 81.) *Volumetric method.* Seven Gm. of the air-dry bark in moderately fine powder is well shaken in a flask with 70 Gm. of ether; 5 Gm. of NaOH solution 15 per cent. is then added and the whole is macerated for half an hour with frequent thorough agitation. The mixture is then strained through fat-free cotton wool and the strained liquid thoroughly shaken up with 10 to 15 drops of water and set aside. Fifty Gm. of the clear ether extract (=5 Gm. of bark) is weighed off into a flask which has been previously washed out first with HCl, then with H_2O, and 30 Gm. of distilled water is added with a few drops of iodoeosin solution. The mixture is then titrated with thorough shaking, with N/10 HCl solution. Each c.c. of N/10 acid used up $\times$ 0·01475 $\times$ 20 gives the percentage of total alkaloids in the bark.

Gravimetric Method. Fifty Gm. of the ether extract, as above (=5 Gm. of the bark), is shaken out in succession with 20, 10 and 10 c.c. of 1 per cent. HCl solution. The acid solutions are filtered into another separator, made alkaline with NaOH and again shaken out with 20, 10 and 10 c.c. of $CHCl_3$. The $CHCl_3$ washings are filtered into a tared Erlenmeyer flask, treated with 5 drops of HCl, and the $CHCl_3$ distilled off. The residue is dried at first at 70–80°C. in the drying oven, and finally in the exsiccator, to constant weight. The weight obtained is that of the hydrochlorides of the total alkaloids, 184 parts of which are equivalent to 147·5 parts of the free bases. This number being calculated and $\times$ 5 gives the percentage of total alkaloids in the bark.

Prulaurasin, the Glucoside of the Leaves of Prunus laurocerasus. H. Hérissey. (*Journ. Pharm. Chim.*, [6], **23**, 1, and *Comptes rend.*, **141**, 959.) A new glucoside, $C_{14}H_{17}NO_6$, prulaurasin, has been isolated from the leaves of the cherry laurel. The fresh leaves are plunged in small quantities at a time into a large volume of *boiling* water or alcohol. If the latter liquid be used, it is important that it should be absolutely boiling or much of the glucoside will be hydrolized. The leaves are kept boiling for 10 minutes, then withdrawn and crushed. They are then again returned to the liquid and boiled for a few minutes. The liquid is strained off, the leaves pressed, the bulked liquor clarified by heating with egg-albumin, and filtered. A little $CaCO_3$ is then added and the liquid is distilled under reduced pressure. When concentrated to about 1200 c.c. for each 5 kilos. of leaves employed, it is cooled and treated with 4 times its volume of alcohol 85 per cent. After standing 24 hours the precipitate is filtered out and rejected. The filtrate is evaporated under reduced pressure and the residue is taken up with water, agitated with $CaCO_3$ and filtered. The filtrate is shaken out 5 or 6 times with ether, the ethereal liquid being rejected. The aqueous portion is evaporated under reduced pressure in the presence of $CaCO_3$. The residue is extracted under a reflux condenser with anhydrous acetic ether, recently distilled after prolonged contact with anhydrous K_2CO_3. On concentrating this acetic ether solution, the glucoside crystallizes out readily, especially if the solution be sown with a crystal of prulaurasin previously obtained. It is then purified by recrystallization or by precipitating solutions in anhydrous acetic ether with perfectly dry ether. The great solubility of the glucoside renders essential the employment of absolutely anhydrous solvents. Prulaurasin crystallizes in several forms, possibly due to different degrees of hydration. It melts at 120–122°, is very soluble in water, alcohol, and acetic ether, insoluble in ether. Its $a_D = -54° 60'$ to $-52° 63'$. Emulsin rapidly hydrolizes it into glucose, benzaldehyde and prussic acid, thus :—

$$C_{14}H_{17}NO_6 + H_2O = C_6H_{12}O_6 + HCN + C_7H_6O.$$

It is probably an isomer of Fischer's amygdonitrileglucoside and of sambunigrin, its melting point and rotation being intermediate between these two glucosides.

Prunus laurocerasus Leaves and P. padus Bark, Cyanogenetic Glucosides in. — K. Jouck. (*Archiv. der Pharm.*,

243, 421.) The bark of *Prunus padus* yields 0·5 per cent. of a yellow amorphous, very hygroscopic glucoside, to which the formula $C_{15}H_{68}N_2O_{23}$ or $C_{15}H_{68}N_2O_{24}$ have been attributed. It yields 6·05 per cent. of HCN on hydrolysis. The leaves of *Prunus laurocerasus* have yielded the author 0·8 per cent. of yellowish amorphous deliquescent glucoside yielding 2·75 per cent. of HCN. (See previous article.)

Pyramidon and Antipyrine, Determination of, in a Mixture. G. Pérugier. (*Annales de Chim. Analyt.*, **10,** 392.) The two bases are first determined together by means of volumetric solution of picric acid. The pyramidon is then titrated with N/10 acid with methyl orange indicator, when it acts as a monobasic body, whereas antipyrine is neutral. The antipyrine is then found in the picric acid determination by difference.

Pyramidon, Determination of. A. Astruc and G. Pérugier. (*Annales de Chim. Analyt.*, **10,** 302.) The method of Lemaire, for the volumetric determination of antipyrine by means of N/20 picric acid solution (*Year-Book*, **1905,** 22), is equally available for pyramidon.

Pyramidon, Quantitative Detection of Antipyrine in. G. Patein. (*Journ. Pharm. Chim.* [6], **22,** 5.) Since pyramidon is much more costly than antipyrine, it is sometimes adulterated with that base. To detect and determine the amount of the adulterant, 1 Gm. of the sample is treated with 5 c.c. of water, 5 c.c. of HCl and 2 c.c. of formalin. The mixture is then heated on the water bath for 4 hours (or set aside in a closed vessel for 4 days). After cooling, an excess of AmOH is added. If the pyramidon be pure, the alkaline liquid remains perfectly clear; but in the presence of antipyrine, a crystalline precipitate is formed. This is collected, washed with a little distilled water, dried, and weighed; the weight × 0·9345 gives approximately the amount of antipyrine in the crystalline formaldehyde-compound. The filtrate from this precipitate is shaken out with three successive washings of $CHCl_3$, the solvent is evaporated in a tared dish, and the residue, after drying, is weighed as pyramidon. The formation of any trace of precipitate, on neutralizing the acid formalin solution as above, is sufficient indication of the impurity of the sample.

Pyrus aucuparia, Fixed Oil of the Seeds of. L. van Itallie and — Nieuwland. (*Pharm. Weekblad* through *Pharm. Zeit.*, **51**, 462.) The seeds of *Pyrus aucuparia* extracted with petroleum ether give 21·9 per cent. of a fluid brownish yellow, sweet tasting, drying oil. Acid value, 2·35; saponification value, 208. The seeds contain 34 per cent. of albumin and 24·2 per cent. of carbohydrates calculated as glucose.

Quinine Formates. H. Lacroix. (*Journ. Pharm. Chim.*, [6], **22**, 90.) Quinine yields two formates, the acid salt $C_{20}H_{24}N_2O_2(HCOOH)_2$, and the basic salt $C_{20}H_{24}N_2O_2HCOOH$. The first is obtained by dissolving 1 mol. of the alkaloid in 2 mols. of the acid. It crystallizes in long white brilliant needles, m.p. 95°C. It is unstable, losing formic acid at 50°C. The basic salt is obtained by saturating a known weight of quinine alkaloid, suspended in water at 50°C. with the exact equivalent of HCOOH, and evaporating at a gentle heat, but a high temperature should be avoided. It crystallizes in tufts of silky needles, m.p. 132°C. This salt is very stable; its solubility in water is 1 : 19 at 16°C., 1 : 8 at 32°C., and it is very soluble in boiling water. The $a_D = -141·1°$. Its solutions are neutral to litmus. From its relative solubility and the large proportion of quinine it contains, also from the fact that its solutions are neutral, basic quinine formate should prove a valuable salt for pharmaceutical use, especially for the preparation of solutions for hypodermic injections. For this purpose it may usefully supersede the neutral hydrochloride, the solutions of which always give rise to pain, and often to the formation of abscesses, when injected.

Quinine Neutral Hydrochlorides. H. Carette. (*Journ. Pharm. Chim.*, [6], **22**, 299.) Reverting to the discussion between himself and C. Erba (*Year-Book*, **1905**, 138, 139), the author gives the results of further experiments with neutral quinine hydrochloride. From water, the salt crystallizes with $2\frac{1}{2}$ mols. H_2O in cauliflower groups of needles, stable in dry air, but hygroscopic. The crystals which form from perfectly anhydrous alcohol contain 1 mol. C_2H_5OH. These crystals are unstable, and in moist air lose all their alcohol, taking up $2\frac{1}{2}$ mols. H_2O. From ordinary "absolute" alcohol the crystals obtained contain $\frac{1}{2}$ mol. H_2O and 1 mol. C_2H_5OH; from alcohol containing a very little water another crop of crystals containing 1 mol. each of C_2H_5OH and of H_2O resulted.

Quinine Salts, Crystallization of, in Presence of Ammonium Salts. P. Guigues. (*Journ. Pharm. Chim.* [6]. **22,** 303.) The addition of a neutral ammonium salt to a solution of a salt of quinine causes the formation of crystals more or less rapidly. The phenomenon is general, and has been found to occur with quinine acetate, arsenate, arsenite, borate, hydrobromide, hydrochloride, carbonate and many other salts. When the solution is too acid, excess of acid may be neutralized with a little ammonia. This method forms a ready means of rapidly obtaining any given salt of quinine. The hydrated alkaloid is dissolved in excess of the given acid with as little water as possible, and the excess is then neutralized with ammonia, the ammonium salt of the same acid is then added; the amount of the latter needed varies; generally, sufficient to destroy the fluorescence will cause crystallization. If ordinary quinine sulphate dissolved by means of H_2SO_4 be employed instead of the free base, the precipitate formed is a mixture of more or less quinine sulphate with the salt of the added acid. If the quinine sulphate be dissolved by means of the other acid, a fairly pure salt of the latter is obtained.

Reduced Iron, Assay of. H. Cormimbœuf and L. Grosman. (*Repertoire* [3], **18,** 146.) The iodine method for the determination of Fe in reduced iron is thus modified. A standard iodine solution is prepared by dissolving 254 Gm. of I and 360 Gm. of KI in 1000 c.c. of water, each c.c. of this = 0·056 Gm. of Fe. A solution of twice normal $Na_2S_2O_3$ is set against this. One Gm. of the reduced iron is treated with 25 c.c. of this solution, and left in contact, with occasional agitation for 6 hours. The liquid is then freely diluted and the uncombined iodine titrated with the $Na_2S_2O_3$ solution.

Relationship between Chemical Constitution and Disinfectant Power. P. Ehrlich and H. Bechhold. (*Zeits. Physiolog. Chem.*, **43,** 173.) Comparing the disinfectant action of various bodies with that of phenol, it is found that the introduction of halogen atoms into the phenol molecule greatly increases its disinfectant power, in direct ratio to the number of atoms of halogen so combined. Thus, penta-bromophenol is 500 times more active than phenol. The introduction of alkyl groups also increases the disinfecting power. The direct union of two phenol molecules or their connexion by certain intermediate groups

such as CH_2, CHOH, $CHOCH_3$ and $CHOC_2H_5$, also has the same result, but the union of two molecules by the groups CO or SO_2 diminishes the disinfectant activity. The introduction of the group COOH has the same effect.

As regards toxicity, the introduction of halogens at first lessens it, but the toxic power increases with the number of atoms of halogen combined. Thus monobromo-phenol is less toxic than phenol; tribromo-phenol equals phenol in poisonous action, tetra- and penta-bromo-phenol are much more toxic than phenol itself.

Rose Oil, Presence of Ethyl Alcohol in. W. H. Simmons. (*Chem. Drugg.*, **68**, 20.) Two samples of rose oil containing small quantities of alcohol are reported on.

Rosemary, Essential Oil of, from French and Spanish Plants. E. J. Parry and C. T. Bennett. (*Chem. Drugg.*, **68**, 671.) The oil examined was distilled in England from authentic dried French and Spanish rosemary leaves. That from the Spanish herb had the α_D + 5° 30′ while the French herb gave oils having the α_D −8° 30′ and −3°. The first three 10 per cent. fractions of the dextrorotatory oil were slightly lævogyre. The dextrorotation of the Spanish oil does not therefore, of itself, indicate impurity.

Saccharose, Pentose and Methyl-Pentose, Presence of, in Fresh and Dried Scammony Root. P. Requier. (*Journ. Pharm. Chim.* [6], **22**, 435, 492, 541.) Dried commercial scammony root is found to contain from 1·1 to 1·8 per cent. of reducing sugars calculated as dextrose, from 2·08 to 3·36 per cent. of saccharose; from 0·226 to 0·253 per cent. of methyl-pentose, and from 0·050 to 0·065 per cent. of pentose. The fresh root, directly imported, gave the following percentages, calculated on the dry material. Reducing sugars, 2·7; saccharose, 6·8; methyl pentose, 0·955 per cent., with traces of pentose.

Saffron, Adulteration of, with Rochelle Salt. J. Beddall Smith. (*Pharm. Journ.* [4], **21**, 867.) Two samples of saffron adulterated with Rochelle salt have been met with. The ash amounted to 32·2 per cent.

Saffron, Colouring Matter of. — Decker. (*Chem. Repert.*, through *Annales de Pharm.*, **12**, 59.) Crocetin has hitherto only

been obtained as amorphous combinations. By treating the feebly alkaline solution, freed from pectin, with ammonium carbonate, at 60°–70°C., the liquid, on cooling, deposits an ammonium salt of crocetin in the form of yellow needles.

Sage, Broad-Leaved, Essential Oil of. O. Wallach. (*Chem. Centralblatt*, 2 [1905], 674.) The oil of the broad-leaved sage, probably derived from *Salvia grandiflora*, is found to contain a phellandrene-like body which gave a nitroso-compound with the m.p. 85–86°C. The oil contained no thujone; its other constituents were lævopinene, cineol and lævocamphor.

Salvia sclarea, Essential Oil of. (*Schimmels' Report, November*, **1905,** 62.) The fresh flowering stems of the herb grown at Miltitz gave 0·117 per cent. of bright olive green oil with a peculiar odour; sp. gr. at 15° 0·9209; $\alpha_D - 23°\ 38'$; acid value 0·9; ester value, 153; acetyl value, 1·9.

Sambunigrin, a New Cyanogenetic Glucoside in Elder Leaves. E. Bourquelot and E. Danjou. (*Journ. Pharm. Chim.* [6], **22,** 154, 210, 219, 385; also — Guignard, *Comptes rend.*, **141,** 16.) Bourquelot and Danjou, by the successive action of invertin and emulsin have found that, in addition to 0·755 per cent. of saccharose, the fresh leaves of *Sambucus nigra* contain a glucoside which is hydrolized by the latter ferment, and that HCN is generated during the hydrolysis. On distilling fresh elder leaves with water, after the addition of emulsin, benzaldehyde was found to accompany the hydrocyanic acid present in the aqueous distillate. The glucoside present was therefore shown to be allied to amygdalin. The amount of the acid thus formed was approximately 0·016 per cent. of the weight of the fresh leaves, much less than that yielded by cherry laurel leaves. Invertin was found to be present in the fresh leaves, and still more of that ferment in the flowers. The young fruits contained less. Emulsin was also present in minute quantity in the flowers, young fruits, and in the leaves, but the amount in the latter is not sufficient to hydrolize the glucoside during drying. Incidentally, the leaves were found to be very rich in potassium nitrate. The air dried leaves of two other species of elder, *Sambucus laciniata*, *S. pyramidalis*, were found to yield HCN on treatment with emulsin and distillation, *S. laciniata* giving 0·06 per cent., and *S. pyramidalis* 0·16 per cent. on the dried leaves. *S. racemosa* and *S. ebulus* gave no HCN;

but a glucoside which was inverted by emulsin was present in both. To isolate the glucoside of *Sambucus nigra* the dried leaves were extracted with boiling 90 per cent. alcohol, and, after adding a little water and some $CaCO_3$ to the alcoholic liquid, the solvent was distilled off. After cooling, the aqueous residue was filtered and the filtrate distilled *in vacuo* to a syrup. This was treated with alcohol 95 per cent., and set aside for 2 days, when an abundant crop of KNO_3 separated. After removing this, more alcohol was added, and after further standing for 4 days the liquid was again filtered. The filtrate was then evaporated to a syrup *in vacuo*, and the residue extracted under a reflux condenser with successive boilings with acetic ether saturated with water. These were bulked and evaporated to dryness *in vacuo*. The residue was taken up with water and filtered through $CaCO_3$. The filtrate was again evaporated *in vacuo* and again extracted with water-saturated acetic ether. On evaporation, this gave a crop of crystals: these were treated with boiling anhydrous acetic ether; the solution, on evaporation, gave the glucoside in long, white, felted needles which, when dried *in vacuo* over H_2SO_4, had a cottony aspect. It has been named *sambunigrin*. It is very soluble in water and in alcohol, fairly so in acetic ether saturated with water. It is lævogyre, $\alpha_D = -75{\cdot}4°$ to $-76°1$. It shrivels at 149° C. and melts at 151–152° C. It does not reduce Fehling's solution. It yields 8·61 per cent. of HCN on hydrolysis. Subsequent investigation showed that the above process might be modified, the leaves being extracted at first with water instead of with alcohol. Its formula was established as being $C_{14}H_{17}NO_3$ and the reaction of hydrolysis expressed as –

$$C_{14}H_{17}NO_3 + H_2O = C_6H_{12}O_6 + C_7H_6O + HCN.$$

Independently, Guignard has also discovered the presence of this cyanogenetic glucoside in elder leaves. He also found that a ferment, resembling emulsin, is present; the absence of sambunigrin from the leaves of *S. ebulus* is also confirmed.

Sandalwood Oil Adulterated with Terpineol. E. J. Parry. (*Chem. and Drugg.*, **68**, 72, 211.) Terpineol has been found as an adulterant of sandalwood oil, being added to give a fictitiously high acetyl value, to cover a deficiency of santalol.

Sandalwood Oil Capsules, Adulterated. E. J. Parry. (*Chem. and Drugg.*, **68**, 951.) The occurrence in commerce of

capsules filled with oil grossly adulterated with so-called "West Indian sandal oil" is recorded.

Sandalwood, Optical Rotation of Essential Oil of. (*Schimmels' Report, Nov.*, 1905, 65.) The limit of rotation $-17°$ previously fixed is now abandoned as too high; the product of a large parcel of wood having been found to have the $a_D - 16° 30'$.

Saponin, Detection of, in Aerated Beverages. J. Vamvakus. (*Annales de Chim. Analyt.*, 11, 161.) One hundred c.c. of the beverage is boiled to drive off CO_2, then treated with excess of basic lead acetate solution. The precipitate is filtered out, washed, and the excess of lead removed from the filtrate by means of H_2S. The PbS is filtered out, and the filtrate boiled until every trace of H_2S has been driven off, and the liquid no longer decolorizes a drop or two of iodine tincture. It is then cooled and divided into 3 parts. A few drops of Nessler's reagent are added to one portion, in the cold. A yellow precipitate, which retains its colour for some time, ultimately turning deep green where in contact with the glass, is formed when saponin is present. Nessler's solution is added to the second portion which is then boiled. With saponin this gives a dense greyish green or greyish black precipitate. The third portion is treated with a few drops of concentrated tartaric acid solution and then with Nessler; it is divided into two parts, one of which is boiled. On standing, neither of these will give a precipitate.

Sicilian Essential Oils. J. C. Umney and C. T. Bennett. (*Pharm Journ.* [4], 21, 860.) The characters of essential oils of peppermint, origanum, geranium, pennyroyal, lemon leaves, and "nepeta," distilled in Sicily from native grown plants are given, and, in certain cases, compared with allied oils of different origin.

Soaps, Antiseptic, Determination of Iodine and Mercury in. A. Seidell. (*Journ. Amer. Chem. Soc.*, 27, 73.) About 10 Gm. of the soap is dissolved in 150 c.c. of alcohol 95 per cent. and from 3 to 5 c.c. of strong HCl is added to the solution; the liquid is then gently warmed on the water bath and water added in small quantities at a time until a clear liquid is obtained after agitation, which, if necessary, is filtered. A current of H_2S is passed through this for 1 hour. The precipitated HgS is col-

lected on a Gooch crucible, washed with alcohol 95 per cent., dried and weighed. The weight $\times 1{\cdot}955$ gives the amount of HgI_2 in the soap.

The bulked filtrate and washings are evaporated to one-third their volume on the water bath, and the original volume made up with water. After cooling, the fatty acids are removed by filtration, the clear filtrate transferred to a separator, the iodine liberated with a few drops of nitrous acid reagent and shaken out with 3 or 4 successive washings of $CHCl_3$. The chloroform solution of iodine is washed with water, then titrated in the usual manner with N/10 $Na_2S_2O_3$ solution. The nitrous acid reagent is prepared by adding to 150 c.c. of HNO_3, in an Erlenmeyer flask, 10 Gm. of starch and 10 Gm. of As_2O_3. The mixture is gently warmed and the nitrous fumes evolved passed into a flask containing about 100 c.c. of strong H_2SO_4. This reagent keeps well ; a few drops of it are sufficient to liberate the iodine under the above conditions.

Sodium and Potassium Hydrate, Commercial, Contaminated with Nitrite. F. H. Alcock. (*Pharm. Journ.* [4], **22,** 705.) Although the presence of nitrite in potassium hydrate was pointed out twenty years ago by Dunstan (*Year-Book*, **1886,** 30), the same impurity is still met with in considerable quantity in commercial sodium and potassium hydrate so-called "pure by alcohol."

Sodium Nitrate, Presence of Chlorate in. L. Grimbert. (*Journ. Pharm. Chim.* [6], **23,** 98.) Three samples of sodium nitrate from different sources have been found to contain more than traces of chlorate. One specimen, after ignition with a little pure saccharose, gave chlorine equivalent to 0·692 per cent. of $NaClO_3$. This impurity is likely to escape detection unless the test be made after exposure to heat sufficient to decompose the $NaClO_3$ into NaCl. In fact, it was discovered accidentally by the high chlorine figures obtained in the course of some chlorine determinations of gastric juice, in which the $NaNO_3$ had been used to aid the incineration of the organic matter.

Solanum sodomœum, Solanine of. G. Oddo and A. Colombano. (*Gaz. Chim. ital.* through *Journ. Pharm. Chim.* [6], **22,** 118.) The berries of *Solanum sodomœum* yield a solanine which differs from that obtained by other investiga-

tors from other species of *Solanum*. It occurs in long white needles having the formula $(C_{23}H_{39}O_8N)_2H_2O$ and the anhydrous body that of $(C_{23}H_{39}O_8N)_2$. It melts without decomposition at 245–250 C. When hydrolized with dilute HCl it appears to form solanidine $C_{19}H_{29}ON$, m.p. 190–192°C. and hexose, but the authors point out that the reaction which can produce these bodies from a compound having the formula $C_{23}H_{39}O_8N$ is not clear.

Spirit of Wine, Detection of Ketones and Aldehydes in, with Vanillin. — Kutscheroff. (*Zeits. f. Analyt. Chem.*, **1905**, 622, through *Pharm. Zeit.*, **47**, 317.) Five c.c. of the spirit is treated with 0·3 Gm. of vanillin and 1 c.c. of H_2SO_4, sp. gr., 1·84. If the alcohol be pure, the mixture will be colourless. In the presence of 1 per cent. of ketone an intense yellow colour is produced ; acetone gives a carmine red, and the higher ketones a blue shade ; occasionally, as when methylbutyl ketone is present, this has a greenish shade, which soon disappears. On diluting these coloured solutions with water, the red colour due to acetone fades to lemon yellow, but the blue of the higher ketones is more persistent, and deepens in shade on diluting. On the addition of alkali to these diluted solutions, the colour due to acetone changes to deep red, while the blue due to higher ketones fades or becomes pale yellow. If 1 or more per cent. of aldehyde be present a deep blue colour is formed. Aldehyde must, therefore, be removed by distillation before applying the test for ketones to the residue. The method is capable of application for the colorimetric determination of these bodies in spirit.

Star Anise Leaves, Essential Oil of. P. Eberhardt. (*Comptes rend.*, **142**, 407.) The fresh leaves of *Illicium verum* yield a quantity of oil on distillation, which has a somewhat lower congealing point (13°C.) than that from the fruits. By utilizing the leaves, the output of oil from a given area of trees may be materially increased from 66 to 100 per cent.

Storax Testing. D. Hooper. (*Pharm. Journ.* [4], **22**, 107.) Trade statistics point to the anomalous fact that within recent years the output of Oriental storax in Asia Minor has fallen greatly, but that France appears as the largest producer of the drug during the past six years. A sample of French storax was found to be grossly adulterated, and to yield only 4 per cent.

of cinnamic acid. Storax purchased in Calcutta was found to be equally impure. Analyses of genuine and fictitious specimens are given, together with the details for a method for determining the total cinnamic acid, the amount of which should not fall 20 per cent.

Strophanthus Seeds and Tincture of Strophanthus, Determination of Strophanthin in. (*Caesar and Loretz's Report, September*, **1905**, 98). *Strophanthus Seeds.* Seven Gm. of crushed strophanthus seeds is treated in a flask with 70 Gm. of absolute alcohol, and the gross weight noted. The whole is then digested, under a reflux condenser, on the water bath for 1 hour. When cold, the original weight is made up by the addition of more absolute alcohol, and 50·5 Gm. is filtered off (=5 Gm. of seeds). The solvent is then evaporated, and the alcohol-free residue treated with petroleum ether, to remove the fat, the solution being passed through a small filter. The unsoluble residue on the filter is then washed back into the rest, in the capsule, with 5 to 8 c.c. of boiling water. The whole is then heated to boiling and treated with 5 drops of basic lead acetate solution. The precipitate is collected on a filter, and washed with boiling water until the filtrate is free from bitterness. This aqueous filtrate is boiled and freed from excess of Pb by means of SH_2, the PbS being filtered out. On evaporating an aliquot part of this filtrate, the residue may be weighed, when dry, as crude strophanthin. To determine the amount of pure strophanthin, the above aqueous filtrate is hydrolized by boiling for 2 hours with 5 drops of pure HCl. When the volume of liquid is reduced to 10 c.c., it is made up to 20 c.c. with water, and, when cold, shaken out with successive washings of $CHCl_3$, the $CHCl_3$ extracts being bulked in a small tared flask. The aqueous portion, after shaking out, is again boiled for 30 minutes, and again shaken out with $CHCl_3$, the process being repeated as long as any bitter taste is evident. The bulked $CHCl_3$ solutions are then distilled to dryness and the residue, when constant, weighed as strophanthidin. The product × 2·182 gives the equivalent of strophanthin.

Strophanthus Tincture. Fifty-one Gm. is taken, the alcohol driven off, and the residue treated with 15 drops of basic lead acetate solution; the process is then continued as above.

Sugar, Modified Method for Determination of, with Fehling's Solution. P. Lavalle. (*Chem. Zeit.*, through *Pharm.*

Centralh., **51,** 120.) The modification consists in employing a large excess of NaOH to retain the Cu_2O in solution. Five or 10 c.c. of Fehling's solution is run into a porcelain capsule with 30 c.c. of 25 per cent. NaOH solution and 50 or 60 c.c. of distilled water. The liquid is then boiled, and the solution containing the sugar run in from a burette in the usual manner until the last drop discharges the blue colour. At the most, only a trace of precipitate is obtained.

Sugars and Formaldehyde, New Reagent for. A. B. Lyons. (*Proc. Amer. Pharm. Assoc.*, **1905,** 330.) The following reagent, which should be freshly prepared, is serviceable for the detection of sugars and of formaldehyde. To 5 c.c. of pure H_2SO_4, add 0·01 Gm. of morphine sulphate and 1 drop of tincture of ferric chloride. To 1 c.c. of the solution to be tested, add 1 c.c. of this reagent down the side of the tube. With aqueous formaldehyde 1 : 50,000, a deep amethyst ring forms at once, the reagent becoming violet blue throughout. The reaction is evident with 1 : 1,000,000. It is not applicable to milk. With solution of sucrose 1 : 100, an immediate violet blue colour, bordered above by orange yellow, is produced : the blue gradually changes to violet ; if shaken together, a brown tint is given. With 1 : 1000 sugar solution the same violet ring, with an orange border, is obtained. The test is valuable for the detection of sucrose in glycerin, since the latter gives no reaction. Invert sugar gives colours similar to sucrose. Lactose also resembles sucrose in its reactions with the test, but the yellow zone is paler.

Syrup of Ferrous Iodide, Determination of Iodine in. (*Roeder's Report*, **1905,** through *Pharm. Zeit.*, **51,** 278.) From 3 to 5 Gm. of the syrup is weighed off in a beaker and diluted with 150 c.c. of distilled water ; 30 c.c. of N/10 $AgNO_3$ solution is then run in ; the solution is acidified with HNO_3, free from HNO_2, and the excess of silver titrated back with N/10 AmCNS solution and iron alum indicator. The numbers of c.c. of N/10 $AgNO_3$ used up, × 0·0145 gives the amount of ferrous iodide in the quantity of syrup taken.

Tamarind Pulp, Composition of. O. Remeaud. (*Journ. Pharm. Chim.* [6], **22,** 424.) The author has examined tamarind pulp prepared by himself, from authentic fruit, the crude commercial product free from seeds, and commercial purified pulp.

Constituents.	Prepared Pulp.	Purified Commercial Pulp.	Crude Commercial Pulp without Seeds.
	Per cent.	Per cent.	Per cent.
Dry residue	62·8	73·04	73·03
Loss at 100° C.	31·16	26·96	26·96
Ash	2·816	3·259	3·198
Matter insoluble in H_2O	6·246	7·078	12·348
Total acidity as $H_2C_4H_4O_6$	11·729	15·340	15·888
Free $H_2C_4H_4O_6$	5·711	7·034	7·359
$KHC_4H_4O_6$	6·055	7·340	6·575
P_2O_5	0·248	0·375	0·275
Other acids in terms of $H_2C_4H_4O_6$	3·603	5·378	5·906
Invert sugar	42·307	34·284	32·000
Saccharose	0·669	0·46	+
Pectin	0·352	+	1·379

The fruits employed were derived from Saigon. One hundred parts gave 24·25 parts of epicarp and fibres, 7·76 parts of fibrous endocarp, 37·07 parts of seeds, and 29·31 parts of pulp. It contained much less pectin than the commercial crude pulp.

Tanacetum boreale, Essential Oil of. (*Schimmels' Report, November*, **1905,** 66.) The fresh herb yields 0·117 per cent. of viscous greenish-brown oil, with a strong thujone odour. Sp. gr., 0·9603; acid value, 30·47; ester value, 40·55.

Taxacatin, a New Crystalline Glucoside in Yew. — Lefebvre. (*Journ. Pharm. Chim.* [6], **23,** 304.) On applying the emulsin hydrolysis method of Bourquelot to the fresh leaves of *Taxus baccata*, the presence of a glucoside was established. This was subsequently isolated by the method of Tanret for separating picein (*Year-Book*, **1895,** 130). It was found to be a crystalline body, m.p., 165°C.; a_D −72°. It gives a deep blue colour with HNO_3, containing a little NO, and therefore differs from picein and coniferin. It has been named taxacatin.

Tecoma mollis, Examination of. L. F. Kebler and A. Seidell. (*Proc. Amer. Pharm. Assoc.*, **1905,** 364.) The

leaves of *Tecoma mollis*, being considerably used as a drug in Mexico, were submitted to chemical investigation. No alkaloid or definite chemical principle was isolated, any medicinal value that the drug may have being attributed to its bitter taste.

Thalictrum aquilegifolium, Cyanogenetic Glucoside in. L. van Itallie. (*Journ. Pharm. Chim.* [6], **22,** 337.) The fresh leaves of *Thalictrum aquilegifolium* yield traces of acetone and from 0·05 to 0·06 per cent. of HCN on distillation; the stem and root give none, nor does *T. glaucum* in any part. If the leaves of the former are first plunged into boiling alcohol, they yield no HCN on subsequent distillation with water, proving therefore that the acid is generated by the action of a ferment on a glucoside. The latter is probably related to the phaseolunatin of Dunstan and Henry (*Year-Book*, **1904,** 140). The presence in the leaves of an enzyme which hydrolizes amygdalin has been proved.

Theobromine, New Reaction for. G. Gérard. (*Journ. Pharm. Chim.* [6], **23,** 476.) Theobromine, 5 Cgm.; water, 3 c.c.; NaOH solution; sp. gr., 1·332, 6 c.c.; are mixed in a test tube and set aside for a few minutes; AmOH solution 1 c.c., $AgNO_3$ solution, 10 per cent. 1 c.c. are added, and the mixture is shaken. It quickly assumes the form of a transparent, colourless jelly, resembling gelatinous silica. If the tube containing it be plunged in water, the jelly melts at 60°C., and again sets on cooling. It may be kept for some weeks, if protected from light. Caffeine, thus treated, gives no gelatinization.

Thyme, Adulterated Essential Oil of. (*Schimmels' Report, November*, **1905,** 67.) Two adulterated samples are reported on: one containing turpentine oil; the other, called "White Thyme oil," had camphor oil as the probable adulterant. The former had the sp. gr., 0·8919; $\alpha_D - 2°$; and contained 12·5 per cent. of phenols; the latter, the sp. gr., 0·8927; $\alpha_D + 12°$; phenols about 12 per cent.

Tinctures, Narcotic, Alkaloidal Assay of. P. Roeder. *Pharm. Zeit.*, **61,** 322.) One hundred and twenty Gm. of the tincture is evaporated to about 6 c.c. on the water bath. The residue is treated with 5 c.c. of solution of ammonia, and transferred, with the smallest possible quantity of water, to a 100 c.c. flask. The liquid is then treated with 60 Gm. of ether-alcohol-

chloroform mixture (chloroform 3, alcohol 1, ether 7, parts by weight), and shaken for 1 hour. After subsiding, exactly 50 Gm. of the liquid (=100 Gm. of the original tincture) is decanted into a separator and shaken out with 20, 10, 10 and 10 c.c. of 3 per cent. HCl solution. The bulked acid solutions are washed twice with 10 c.c. of chloroform, then made alkaline, and shaken out with 10, 10, 10 and 10 c.c. of $CHCl_3$. The $CHCl_3$ solution is evaporated in a tared capsule, the residue dried at 100°C. for 3 hours, and weighed.

Tragacanth, Powdered, Detection of Gum Acacia in. E. Payet. (*Annales de Chim. Analyt.*, **10,** 63.) Since tragacanth is free from oxydase, such as has been shown to be present in gum acacia (*Year-Book*, **1904,** 282), its freedom from adulteration with the cheaper gum may be thus established. An aqueous 1 : 30 solution of the gum, prepared with cold water, is treated with an equal volume of 1 per cent. aqueous solution of guaiacol and 1 drop of H_2O_2 solution. On agitating, the liquid rapidly develops a brown colour if acacia be present.

Trehalose, Determination of, in Vegetables and in Trehala. P. Harang. (*Journ. Pharm. Chim.* [6], **23,** 16 and 471.) The presence of trehalose may be determined polarimetrically by means of the optical deviation observed before and after treatment of solutions containing it, with the specific ferment trehalase obtained from cultivations of *Aspergillus niger*. In this manner its presence and amount may be readily demonstrated in certain fungi, also in trehala, the saccharine, secretion found in the cocoon of a species of beetle, which was the original source of trehalose. [For description of trehala and the insect producing it, *see* Hanburys' *Science Papers*, 159.—Ed. *Year-Book*.]

Urine, Acetone in, Detection of. G. Frommer. (*Apoth. Zeit.*, **20,** 629.) Ten c.c. of the urine is treated with 1 Gm. of KOH and 10 or 12 drops of salicylic aldehyde in a test tube. The tube is then heated to 70°C. If acetone be present, a red ring is formed at the bottom of the tube around the dense solution of KOH. If the salicylic aldehyde is not added until after the KOH has dissolved, a yellow colour is formed slowly turning to red.

Urine, Detection of Bile Pigments in. L. Grimbert. (*Journ. Pharm. Chim.* [6], **22,** 491.) To 10 c.c. of the urine, 10 c.c. of 10 per cent. $BaCl_2$ solution is added, and the pre-

cipitate is centrifugated, or collected on a small filter. It is then suspended in 4 c.c. of alcohol 90 per cent., containing 5 per cent. of HCl. The mixture is heated to boiling in the water bath for 1 minute, then set aside. In the absence of bile pigments, the supernatant liquid will be colourless; in their presence it is bluish green or deep green. It may show a brownish tint due to insufficient oxidation; 2 drops of H_2O_2 added will then give the characteristic green colour on again heating. If the brown colour still persists, this is due to the presence of altered bile pigments in stale urine. If only traces of bile are sought for, 100 or 200 c.c. of urine must be treated. When precipitation by $BaCl_2$ is scanty, a few drops of 10 per cent. solution of Na_2SO_4 may be added to the urine, before adding the $BaCl_2$.

Urine, Determination of Uric Acid in. G. Guerin. (*Journ. Pharm. Chim.* [6], **23**, 516.) One Gm. of anhydrous Na_2CO_3 is dissolved in 120 to 125 c.c. of the urine, which is then filtered from the precipitated phosphates; 100 c.c. of the filtrate is then treated with 25 c.c. of 50 per cent. $AmNO_3$ solution and 5 c.c. of AmOH, and set aside over night. The precipitated ammonium urate is then collected on a plain filter, the last particles being washed on to the filter with 10 per cent. $AmNO_3$ solution, containing 1 per cent. of official AmOH. The precipitate is then washed with more of the same solution, and transferred, by means of a jet of water, to a flask. The liquid and precipitate is made up to about 100 c.c. with water, and 40 c.c. of 50 per cent. H_2SO_4 solution is added. The mixture is warmed to 50°C., then titrated with a solution of 1·5 Gm. $KMnO_4$, in 1,000 c.c. of water. The number of c.c. of this solution used up × 0·00356 gives the weight of uric acid in 100 c.c. of urine. Albumin does not interfere with the results. Urine which contains a sediment of urates should be gently warmed on the water bath, until this is redissolved, before adding the Na_2CO_3.

Urine, Iodometric Determination of Uric Acid in. A. Ronchèse. (*Journ. Pharm. Chim.* [6], **23**, 336.) One hundred Gm. of the urine is treated with 15 c.c. of AmOH solution, sp. gr., 0·960, and 15 Gm. of AmCl, and set aside for 30 minutes. The precipitated ammonium urate is collected on a filter and washed with a solution of AmOH, sp. gr., 0·960, 150 c.c., AmCl 150 Gm., in sufficient water to make 1 litre. The precipitate is suspended

in 300 c.c. of water, and dissolved with a slight excess of acetic acid; 20 c.c. of a saturated solution of $Na_2B_4O_7$, and $KHCO_3$ is then added and the mixture titrated, in the usual manner, with N/10 iodine solution, with starch indicator; the titration being stopped as soon as a sharp blue colour is evident, disregarding the decolorization which takes place in a few instants, which is not due to uric acid. When x=the number of c.c. of N/10 iodine solution used up $(x \times 0{\cdot}084) + 0{\cdot}01$ = the amount of uric acid per litre. The presence of albumin does not interfere with the accuracy of the method.

Urine, Detection of Bilirubin in. P. Trapani. (*Semaine médicale*, through *Journ. Pharm. Chim.* [6], **23,** 76.) A reagent is prepared with equal volumes of mercuric cyanide solution 5 per cent., and 10 per cent. caustic potash solution. About 10 c.c. of the urine is treated, in the cold, with 5 c.c. of this reagent; in the presence of bilirubin a red colour is obtained, which disappears on adding acetic acid. A more sensitive reaction results from shaking out the urine with $CHCl_3$, separating and evaporating the latter, and adding a few drops of KOH solution, then a little of the reagent. Albumin does not affect the test.

Urine, Detection of Indican in. A. Grueber. (*Pharm. Zeit.*, **71,** 752.) The urine is treated with twice its volume of strong HCl, then with a few drops of 1 per cent. solution of osmic acid. In the presence of indican, a blue or violet colour is produced. If only traces be present, the tint is rendered more evident by shaking up with a little $CHCl_3$. When this separates, it will be coloured blue if any indigotin has been formed.

Urine in Pancreatic Disease, Improved Method for Examining. P. J. Gammide. (*B.M.J.* [1], **1906,** [2368], 1150.) The production of a crystalline precipitate in urine with phenylhydrazine hydrochloride, other than that given by sugar, serves as a useful aid to the diagnosis of pancreatic disease. The urine examined should be fresh; if alkaline, it should be made acid with HCl before testing; if glucose be present, this should be eliminated by fermentation after the urine has been boiled with acid and the excess neutralized. Administration of $CaCl_2$ interferes with the test.

The bulked secretion is filtered several times, and examined

for albumin, sugar, urobilin and indican. If free from sugar and acid, 1 c.c. of strong HCl is mixed with 20 c.c. of the clear filtrate and boiled for 10 minutes on the sand bath, in a small flask with a funnel condenser. The liquid is then cooled and made up to 20 c.c. with cold distilled water. Excess of acid is neutralized by slowly adding 4 Gm. of $PbCO_3$, and the liquid is filtered after reaction. The filtrate is well shaken with 4 Gm. of powdered basic lead acetate, again filtered, and excess of Pb removed by heating to boiling with 2 Gm. of powdered Na_2SO_4. After cooling, the precipitate is filtered out; 10 c.c. of the clear filtrate is made up to 18 c.c. with distilled water, and added to 0·8 Gm. of phenylhydrazine hydrochloride, 2 Gm. of powdered sodium acetate, and 1 c.c. of acetic acid 50 per cent., in a small flask. The mixture is boiled for 10 minutes under a funnel condenser, then filtered hot into a test tube graduated to 15 c.c., to which volume it is made up, if necessary, with hot distilled water. In well-marked cases of pancreatic inflammation, a precipitate will be evident in a few hours, but the mixture should be allowed to stand over-night for a deposit to form. The characteristic crystals of the pancreatic reaction, when examined *sub lente*, are seen to consist of sheaves of hair-like filaments, which dissolve in H_2SO_4 33 per cent., in 10 to 15 seconds after the acid first touches them. To exclude traces of sugar, a control experiment with another 20 c.c. is made with the same urine, omitting the addition of HCl. An illustration of the typical crystals is given.

Urine-Test for Typhoid, Methylene Blue as. — Russo. (*Bull. gén. de Thérapeut.*, **151,** 83.) In cases of typhoid, after the second day, a bright green colour reaction is given by 4 or 5 drops of methylene blue with 4 or 5 c.c. of the patient's urine. Normal urine and that of subjects suffering from other febrile affections does not give this reaction; but that from cases of smallpox, as soon as the eruption appears, and chicken-pox at the commencement, do so.

Vanillin and Coumarin, Distinctive Reaction for. (*Pharm. Zeit.*, **51,** 512, after *Chem. Centralh.*) With a mixture of 5 c.c. of phenol and 3 c.c. of H_2SO_4, vanillin gives at first a yellow, then a red colour in the cold. On heating the mixture for a few minutes to 160–170°C., a blood-red, then an almost black colour is developed. On diluting this with water and adding

a few drops of twice normal NaOH solution, the solution is coloured dark red. Coumarin gives no colour on heating.

Vanillin, Coumarin, and Acetanilide in Vanilla Extract, Determination of. A. L. Winton and E. M. Bailey. (*Journ. Amer. Chem. Soc.*, **27**, 724.) Until 1901 none of the commercial vanilla extracts examined contained acetanilide, though many were undoubtedly made from synthetic vanillin, but during the present year 4 out of 47 adulterated samples contained amounts varying from 0·08 to 0·15 per cent. The following modification of the Hess and Prescott method gives satisfactory results for the determination of vanillin, coumarin and acetanilide :—

Weigh out 25 Gm. into a 200 c.c. beaker with marks showing 25 c.c. and 50 c.c. To remove alcohol, dilute to the 50 c.c. mark and evaporate to 25 c.c. in a water-bath which has a temperature not exceeding 70° C. Dilute again to 50 c.c. and evaporate to 25 c.c. (These directions should be followed carefully, as greater concentration or higher temperature entails loss of coumarin.) Add normal lead acetate solution until no more precipitate falls. Stir with a glass rod, filter through a moistened filter, and wash 3 times with hot water, taking care that the total filtrate does not exceed 50 c.c. Cool and shake with 20, 15, 15 and 15 c.c. of ether successively. Shake the mixed ethereal solutions with 10 c.c. of 2 per cent. ammonia, and then 5 times with 5 c.c. Set aside the mixed ammoniacal solutions for the determination of vanillin. Wash the ether solution into a weighed dish and allow it to evaporate at the room temperature. Dry in a desiccator and weigh. Stir the residue for 15 minutes with 15 c.c. of petroleum ether (b.p. 30° to 40°C.), decant the clear liquid into a beaker. Repeat two or three times. Allow the residue to stand in air till apparently dry, and complete the drying in a desiccator. Weigh and deduct the weight from the weight of the residue obtained from first evaporating the ether. This residue, if acetanilide, should have a m.p. about 112° C. and respond to the qualitative tests given below. Allow the petroleum ether extract to evaporate at the room temperature. If it is pure coumarin, the residue should melt near 67°C., and respond to Leach's test. Slightly acidulate the ammoniacal solution with diluted hydrochloric acid and shake out 4 times with ether, as in the first ether extraction. Evaporate at room temperature in a tared platinum dish, dry in a desiccator and weigh. If acetanilide has

not been previously detected, this residue should be pure vanillin, with m.p. about 80°C. If acetanilide has been detected, dissolve the residue in 15 c.c. of 10 per cent. ammonia and shake out with an equal volume of ether. Evaporate the ether, dry in a desiccator and weigh. Deduct this from the previous weight, thus obtaining the weight of pure vanillin. The total weight of acetanilide is obtained by adding the weight of this last extract to that of the residue previously obtained and identified as acetanilide.

The following reactions for acetanilide, recommended by Ritsert (*Pharm. Zeit.*, **33**, 383), have been found reliable: Boil the residue for 2 or 3 minutes with 2 or 3 c.c. of concentrated hydrochloric acid, cool and divide into 3 portions in small tubes (4 or 5 mm. diameter), and test separately as follows—

1. Indophenol reaction. Add carefully 1 to 3 drops of a solution of chlorinated lime (1 to 200) so that the solutions do not mix. A beautiful blue ring indicates acetanilide.

2. Add a small drop of permanganate solution. A clear green colour is formed if an appreciable amount of acetanilide is present.

3. Add a small drop of 3 per cent. chromic acid solution. Acetanilide gives a yellow-green solution, changing to dark green, on standing 5 minutes, and forming a dark blue precipitate on the addition of a drop of caustic potash solution.

Vanillin, Determination of, in Vanilla Pods and Preparations thereof. J. Hanuš. (*Pharm. Zeit.*, **50**, 1022, 157, and *Pharm. Centralh.*, **47**, 157.) Three Gm. of the crushed pods are extracted for 3 hours with 50 c.c. of ether, the solvent distilled off, and the residue again taken up with a little ether and filtered and evaporated. The residue is then treated with 50 c.c. of water, at 60°C. on the water bath; 0·25 Gm. of metanitrobenzhydrazide is then added to the aqueous solution in a stoppered flask, which is kept for a time on the water bath, then set aside, with occasional agitation, for 24 hours. The vanillin is precipitated quantitatively as the compound vanillin metanitrobenzhydrazone, $NO_2 \cdot C_6H_4 \cdot NH_4 \cdot N : CH \cdot C_6H_3 \cdot (OCH_3) \cdot OH$. The precipitate is then washed with 3 successive washings of petroleum ether to remove fat; it is then transferred to a Gooch crucible, again washed with water, then with petroleum ether, and finally dried at 100–105°C. for 2 hours. The weight found $\times 0{\cdot}4829$ gives the equivalent of vanillin. Preparations of

vanillin are treated in a similar manner, any alcohol present being previously removed. The absence of other aldehydes, especially heliotropin, must be ensured. The presence of acetanilide or of benzoic acid, often used to adulterate vanillin, does not affect the results.

Veratrine, Reactions of. C. Reichard. (*Pharm. Centralh.*, **46,** 644.) The following reactions were obtained with the mixed alkaloids of sabadilla, known in commerce as *veratrinum purissimum*. With strong H_2SO_4, on a porcelain surface, solid veratrine gives a fine violet-red colour; other alkaloids, notably papaverine, give a similar reaction. The colour is destroyed on dilution with water, but is restored by evaporation of the latter. It is also given by dilute acid when water has been evaporated by application of heat. Veratrine is without action on mercuric or mercurous salts. When it is rubbed with a particle of mercurous nitrate and the powder is moistened with water, no change takes place even on standing for 12 hours, the moisture being replaced as it evaporates, and the moist magma is not affected by HCl, nor is the red colour given with strong H_2SO_4. Similarly, no reaction is obtained with $HgCl_2$ and HgO or HgCl. If the mass be treated with H_2SO_4, some blackish spots become evident, and the surface becomes brown, then yellow, the tint slightly increasing in 12 hours. This behaviour with mercury salts is characteristic. If a few particles of veratrine are moistened with a drop of formalin and set aside for 12 hours, a snow-white mass is obtained, which gives a dull yellow reaction with strong H_2SO_4. With strong solution of KCNS, the alkaloid, treated as above, gives a yellowish mass, which reacts similarly with H_2SO_4. A number of other colour reactions are given.

Veratrum album Rhizome, Alkaloids of. G. Bredemann. (*Apoth. Zeit.*, **21,** 41, 53.) The percentage of total alkaloids in *Veratrum album* rhizome ranges from 0·199 to 0·923 per cent. To determine these, 12 Gm. of the powdered rhizome is macerated with a mixture of chloroform 60 c.c. and ether 60 c.c., and 10 c.c. of NaOH solution for 3 hours, with frequent agitation. Sufficient water is then added to cause the powder to aggregate; the ether-chloroform is then decanted, clarified with MgO and a few drops of water, filtered, and 100 c.c. of clear filtrate collected; this is shaken out with 3 successive 10 c.c. of water acidified with $HC_2H_3O_2$. The bulked acid solutions are made alkaline, and

shaken out with 3 successive washings of the ether-chloroform solvent. On evaporating these to dryness, the residue is weighed when constant at 100°C. From the total alkaloids, jervine and rubi-jervine are isolated by treating the acetic acid solution with metaphosphic acid, when they are precipitated. The filtrate is made alkaline with AmOH and shaken out with ether, which removes protoveratrine ; it is then similarly treated with chloroform, which removes pseudo-jervine. *Jervine* $C_{26}H_{37}O_3N \cdot 2H_2O$ forms white acicular prisms ; m.p., when dry, 241°C. *Rubi-jervine* is less soluble in cold $CHCl_3$ and forms crystals with the m.p. 234. Its formula is $C_{26}H_{43}O_2N \cdot H_2O$. *Pseudo-jervine*, $C_{29}H_{43}O_7N$, forms thin hexagonal plates, m.p. 304°C. ; *Proto-veratrine* forms small hexagonal plates. Another base occurs in the mother liquor after separating the protoveratrine, which crystallizes in aggregated needles, m.p., 239–241°C.

Walnut Oil, Detection of other Oils in. P. Balavoine. (*Schweiz. Woch.*, **44,** 244.) The author directs attention to the value of Belliers' test for the detection of other oils in walnut oil. One c.c. of the oil is exactly measured into a test-tube and treated with 5 c.c. of alcoholic KOH solution (16 Gm. of KOH in 100 c.c. of alcohol 92 per cent.). A similar tube is prepared with an authentic sample of pure walnut oil. The tubes are warmed, without boiling, until the oil has dissolved, then corked, and kept at 70°C. in the water bath for 30 minutes ; the KOH is then neutralized with the equivalent of acetic acid, 25 per cent., previously determined. The tubes are again corked, and immersed in a water bath at 25°C. until the contents have reached this temperature ; they are then transferred to another bath at a temperature of 17–19°C., frequently agitated, and the time noted which is required for the formation of a precipitate of fatty acids. With pure walnut oil this period will be several minutes, longer than with an oil containing 5 per cent. of sesame, cotton arachis, or olive oil. With poppy seed oil an admixture of 10 per cent. will be evident by a difference of about 3 minutes in the formation of the precipitate, and 7 minutes for 20 per cent. The time taken in different experiments is not identical, due to different conditions, such as rate of cooling, but the pure oil is always several minutes longer in showing a separation than mixed samples. This time, with pure oil, varies in experiments quoted from 18 minutes to 29 minutes. Twenty per cent. of poppy seed oil may be readily detected thus, and 5 or 10 per

cent. of other oils. Rancid walnut oil gives a precipitate sooner and more abundantly than fresh oil.

Water, Simple Test for Bacillus Coli in. — Christean. (*Pharm. Centralh.*, **47,** 318.) The water is treated with 1 per cent. of cane sugar, 1 per cent. of peptone, and 0·05 per cent. of NaCl, and kept at 46°C. Under these conditions, *B. coli* develops and generates gases. Other bacteria do not.

Wine, Determination of Tannin in. — Kramski. *Zeits. für Analyt. Chem.*, through *Pharm. Zeit.*, **51,** 120.) A reagent is prepared with 25 Gm. of $ZnSO_4$ in water, to which sufficient AmOH is gradually added to redissolve the precipitate at first formed. About 300 c.c. of AmOH is then added, and the solution is made up to 1,000 c.c. Fifty c.c. of red or 100 c.c. of white wine is rendered alkaline with AmOH and warmed, the precipitate formed being disregarded; 20 c.c. of the zinc reagent is then stirred in; after the formation of the precipitate, the volume of the liquid is brought to about 300 c.c. with warm water, and the mixture set aside. The precipitate is then washed by decantation with warm, faintly ammoniacal water, and collected, preferably on a Gooch crucible, and dried to constant weight at 100–130°C. The weighed dry residue is then incinerated, cooled, moistened with a few drops of strong HNO_3, and again burnt. After cooling, the weight is again taken. The difference in weight before and after ashing is taken as tannin.

Wood Oils, Phillipine A. M. Clover. (*Phillipine Journ. Sci.*, through *Journ. Soc. Chem., Ind.*, **25,** 389.) *Supa Oil from Sindora wallichii* is light yellow, mobile and slightly fluorescent, with a faint, characteristic odour. Sp. gr., 30°/30° 0·9202; α_D — 31·3° at 30°C. It deposits white crystals of a hydrocarbon at 20°C, m.p., 63° to 64°C. The oil slowly resinifies in air. When distilled under 40 mm., the bulk passes over at 143–149°C., the residue being fluid. The distillate had the sp. gr., 0·9053 at 30°/30°C., and boiled; when redistilled at 255° to 267°, under 760 mm. Cadinene is present in it in quantity. The non-volatile portion contained a hydrocarbon, m.p., 63–65°C., insoluble in alcohol.

Balao; Apctong Oil, from a species of *Dipterocarpus*, is a viscous fluid, with a large amount of suspended granular matter. It has a faint odour, and is soluble in most solvents, except alcohol. It hardens in steam, and cannot be distilled under

reduced pressure. It is probably a sesquiterpene, or a mixture of sesquiterpenes.

Malapaho ; Panao Oil, from *Dipterocarpus vernicifluus*, dries more slowly than Balao ; when fresh, it is white and viscous, becoming darker with age. It yields oil when distilled over a naked flame, containing a sesquiterpene, b.p. 256–261 under 760 mm., which, when purified by redistillation *in vacuo*, had the sp. gr. 0·9165 at 30°/30°C. ; $\alpha_D - 54°$.

Mayapis Resin, from *Dipterocarpus anisoptera vidaliana*, is considered by Tavera to be identical with gurjun balsam. It contained 25 per cent. of a sesquiterpene, separable by distillation, leaving a hard residue. When rectified, this sesquiterpene was light yellow ; b.p., 132°–140° under 17 mm. ; sp. gr., 0·9056 at 30° 30°C. The original resin was very viscous and hardened in the air, or, on warming to a white solid, more rapidly than balao or malapaho. These properties are quite distinct from those of gurjun balsam.

MATERIA MEDICA

PART II

MATERIA MEDICA

Acetopyrine, Preservation of. R. Guyot. (*Bull. Soc. Pharm. de Bordeaux*, **45,** 289.) Acetopyrine should be kept in air-tight bottles with paraffined corks, protected from light, or it will decompose, becoming spongy, red in colour, showing a crystalline sublimate of salicylic acid, as well as giving off free acetic acid.

Acetylized Copaiba Resin. (*Chem. Zeit.*, **30,** 115.) It is claimed that the viscous mass which results from the action of acetic anhydride on copaiba resin is useful for the administration of copaiba, since it does not disturb the digestion like the normal resin. It passes through the stomach unaltered and is decomposed in the intestines.

Acidol. R. Flatow. (*Therapeut. Monats.*, **19,** 639.) Betaine hydrochloride is introduced under this name as a substitute for hydrochloric acid, for those gastric affections which are due to insufficient secretion of that acid, such as certain forms of dyspepsia. It is specially useful in combination with pepsin, in the preparation of tablets and cachets. It is given in doses of 8 to 16 grains in the form of tablets; it may also be administered in the form of a powder. The taste is pleasantly acid. Acidol occurs in colourless crystals, readily soluble in water.

Aconites, Indian, and their Poisonous Constituents. (*Bull. Imper. Inst.*, **4,** 32.) O. Stapf (*Ann. Roy. Bot. Gard., Calcutta*, **10,** [2],) classifies the Indian aconites under three groups—

(1) *Gymnaconitum* type includes species of annual duration, of which only one, *Aconitum gymnadrum*, is known.

(2) *Lycoctonum* type comprises perennial roots of *A. læve*, *A. luridum*, and *A. moschatum*.

(3) *Napellus* type includes the greater number of species, the roots of which are biennial and normally paired. These are further divided from the anatomical structure of their roots into tree sub-types, which practically agree with the types of Goris (*Bull. Sci. Pharmacol.*, **3,** 103). These are—

(1) *Napellus* group, comprising *A. soongaricum*, *A. chasmanthum*, *A. violaceum*, *A. falconeri*, *A. spicatum*, *A. laciniatum*, *A. ferox*, *A. heterophylloides*, *A. leucanthum*, and *A. dissectum.*

(2) *Anthora* group, consisting of *A. rotundifolium*, *A. heterophyllum*, *A. naviculare*, *A. palmatum*, and *A. hookeri.*

(3) *Deinorrhizum* group, including *A. deinorrhizum* and *A. balfourii.*

The new species *spicatum*, *laciniatum*, *deinorrhizum*, and *balfourii* have hitherto been regarded as varieties of *A. ferox.*

The botanical source of Indian "bish" or "bikh" aconite is at present uncertain. Watt and Stapf regard it as being furnished by *A. spicatum*, while E. M. Holmes considers *A. laciniatum* to be the source. Since *A. spicatum* yields a base, bikhaconitine, quite distinct from the pseudaconitine found in "bikh" root purchased in Europe, it is not probable that that species is the true source of the drug.

Aconitum chasmanthum gives roots which were at first attributed to *A. napellus*; but it yields a crystalline alkaloid indaconitine which, although resembling aconitine, is distinct therefrom; it is slightly less toxic.

Aconitum deinorrhizum was formerly examined under the name of *A. ferox*, var. *atrox*, and found to contain pseudaconitine (*Year-Book*, **1896,** 42). *A. balfourii* has been found to contain the same base, the young tubers containing as much as 1 per cent., or twice as much as the mother-root.

Aconitum spicatum, formerly considered to be a variety of *A. ferox*, has been found to contain bikhaconitine.

Aconitum heterophyllum is noteworthy, since its alkaloid atisine is non-toxic in small doses (*Year-Book*, **1897,** 57).

Aconitum palmatum also contains a non-poisonous base, palmatisine, resembling, but distinct from, atisine.

Stapf is of opinion that European *Aconitum napellus* does not occur in India.

Aldol as a Hypnotic. Camurri. (*Boll. Chim. Farm.*, through *Journ. Pharm. Chim.*, **22,** 451.) It is suggested that aldol, β-oxybutyric aldehyde, $CH_3.CHOH.CH_2.CHO$, obtained

by the prolonged contract of HCl on $CH_3.CHO$, may be of service as a hypnotic. Aldol is a thick, syrupy, odourless liquid, miscible with 2 parts of water. On keeping, it becomes polymerized into paraldol, a crystalline body.

Alypine, a New Local Anaesthetic. E. Impens. (*Apoth. Zeit.*, through *Journ. Pharm. Chim.* [6], **22,** 225.) Primary tetramethyl - diamino - ethyl - dimethyl - benzoylcarbinol - hydrochloride, under the more convenient name of alypine, has been introduced as a local anaesthetic. It occurs in crystals, m.p. 169°C., which are very soluble in water, the solutions being neutral, and may be sterilized by boiling for not longer than 10 minutes over the naked flame. If rendered acid by overheating, they may be neutralized by alkali. The solutions keep well. Alypine is readily absorbed by the mucous membrane and the subcutaneous tissue, and also by hypodermic injection No inflammation follows the use of a 4 to 5 per cent. solution. It is equal to cocaine in anaesthetic power, and reacts well in much more dilute solutions. It is specially valuable for ophthalmic use. A 1 or 2 per cent. solution causes complete anaesthesia with the human eye, which persists for 8 to 10 minutes. Its toxicity, compared with that of cocaine, is relatively slight. It does not occasion mydriasis, vaso-constriction, nor affect the visual accommodation.

Argyrol. (*Merck's Jahresberichte*, **19,** 29.) This is one of the many silver-albuminoid compounds prepared by the action of silver nitrate on vitellin. It contains 30 per cent. of silver, and has been found very efficacious in the treatment of gonorrhœa, conjunctivitis, and as a general ophthalmic antiseptic. For gonorrhœa, it is given in 1 or 2 per cent. solution, as a urethral injection. For gonorrhoeal conjunctivitis, a 15 to 20 per cent. solution has been used, or a 10 per cent. ointment.

Arhovin.—Anselmino. (*Journ. Pharm. Chim.*, [6], **22,** 452, after *Berichte Pharm.*) This body, a remedy for gonorrhœa, has been stated to be a combination of diphenylamine and the ethyl ester of thymobenzoic acid. The author points out that thymobenzoic acid is, so far, unknown; he finds that arhovin is simply a mixture of thymol, ethyl benzoate, and diphenylamine.

Belloform. F. Niemann. (*Apoth. Zeit.*, **21**, 181.) Belloform, a new, relatively non-toxic and perfectly non-irritant disinfectant, is stated to be a condensation-product of formaldehyde in oily solution with high boiling hydrocarbons. It is a cherry-red liquid, soluble in all proportions in water and in alcohol. With very hard calcareous waters the solutions formed are turbid.

Betaine Hydrochloride. (*Merck's Jahresberichte*, **19**, 40.) Betaine hydrochloride has been shown to neutralize tetanus toxin. It has, therefore, been administered together with tetanus antitoxin, by hypodermic injection in doses of 3 grains. (*See also* Acidol.)

Biochemical Standardization of Drugs. W. E. Dixon and G. S. Haynes. (*Pharm. Journ.* [4], **21**, 754.) The communication shows the importance of the biochemical method for the standardization of drugs, especially those which act on the heart, such as digitalis, squill and strophanthus. It was found that all trade specimens of tinctures of digitalis, squill and strophanthus examined fell below the potency of a standard tincture of each, prepared for the authors by E. S. Peck. These standard tinctures remained constant in strength between May and November. The commercial tinctures varied very widely in potency, especially that of strophanthus. [See also *Year Book*, **1905**, 387.]

Bromotan. (*Pharm. Zeit.*, **50**, 1097.) This name has been given to bromo-tannin-methylene-urea. It is an odourless and tasteless powder used as an application in skin diseases, in the form of a 10 per cent. dusting powder or as an ointment.

Barutine. (*Nouveaux Remèdes*, 21, 532.) Barutine is a compound of barium and theobromine in which the properties of barium of increasing the blood pressure is combined with the diuretic action of theobromine. It is claimed that the toxic action of barutine is much lower than that of an equivalent of barium chloride. It occurs as a white crystalline powder, soluble in water, giving faintly alkaline solutions. It is generally prescribed in 1·25 per cent. solution of which the dose is a tablespoonful three times daily. It is given in heart affections and renal disorders. Since its solutions absorb CO_2 from the air,

and are decomposed, they should be carefully preserved in well filled and well corked bottles.

Benzoyl Peroxide for Burns. — Loewenhart. (*Rev. de Thérap.*, through *Bull. Comm.*, **33,** 471.) Benzoyl peroxide, $C_6H_5.CO.O_2.C_6H_5$, has been introduced as an analgesic antiseptic dressing, specially suitable for burns, for which it is applied as a 10 per cent. lanoline ointment. It is quite free from irritant action, and quickly relieves pain. It occurs in white prismatic needles, sparingly soluble in water, soluble in oil 2 or 3 : 100. It melts at 103·5°C.

Calcium Salts in the Treatment of Tuberculosis. P. Ferrier. (*Soc. Méd. des Hôpitaux*, through *B.M.J.* **1, 1906,** 889.) Having noted that cases of tuberculosis invariably give evidence of marked decalcification of the system, the treatment of such cases by the administration of lime salts was suggested, and, in practice, has given excellent results. At the same time, all acid, in any form, was carefully eliminated from the diet, also all particularly acid fruits, such as oranges and lemons, which are often consumed in large quantities by patients. A glass of aerated water rich in calcium bicarbonate, such as St. Gulmier water, is prescribed half an hour before each meal. Calcium carbonate, or tribasic phosphate 7 grains, and sodium chloride 6 grains, are given three times a day, with or immediately after each meal. Under this treatment digestion is improved in an amazing way and the blood regains its coagulating and plastic properties, while lung lesions of the first or second degree are rapidly and favourably modified. Water containing calcium sulphate must be avoided, and the use of milk, with its tendency to lactic fermentation, should be carefully watched. It is noted that at all maritime resorts known to give favourable results in tuberculous cases, the water is heavily charged with calcium bicarbonate. E. Sergent confirms the value of the treatment, after eighteen months' trial. He has noted cases which showed most rapid improvement under it, gaining as much as 4 to 6 lbs. in weight in a fortnight. The treatment has the advantage that it may be combined with the administration of creosote or similar drugs. The assimilation was better than when patients were overfed. Rénon speaks favourably of the method in hospital cases, and notes that tuberculosis is not found among the workers in lime kilns, even

among alcoholics, although the industry is an abnormally dusty one.

Cetrarin. Gigon. (*Merck's Jahresberichte*, **19,** 50.) The bitter principle of Iceland moss, cetrarin or cetraric acid, is a powerful anti-emetic. It occurs as a crystalline powder, readily soluble in alkalies. It may be usefully presented to counteract the vomiting of pregnancy, or that following chloroform narcosis, or in sea-sickness, in doses of $1\frac{1}{2}$ to 3 grains in a 2 per cent. alcoholic solution.

Charcoal as an Antidote to Fungus Poisoning. (*Amer. Drugg.*, **48,** 323, after *Bull. gén. de Thérap.*) Animal charcoal, or if that be not at hand, powdered wood charcoal, suspended in water, is stated to relieve or check the most severe cases of "mushroom" poisoning. Several spoonfuls should be given for a dose.

Cidrase. — Coutureux. (*Pharm. Centralh.*, **46,** 753.) Cidrase is stated to be a preparation of the peculiar yeast of cider. It is a brownish dry substance with a characteristic apple-like odour and a slightly acid taste. In addition to the usual yeast constituents, it is claimed to contain a very active oxydase. It is introduced as a remedy for gout and rheumatism, the dose being 8 grs. twice to six times a day at the commencement of the meals, in a little sweetened water. It is also given for loss of appetite in tuberculosis, and as a preventative of secondary infection.

Clavine. E. Vahlen. (*Merck's Jahresberichte*, **19,** 55.) Clavine is claimed to be the active principle of ergot, which acts directly on the uterus, and not to cause cramp, like cornutine, nor gangrene, like sphacelinic acid. It occurs in a crystalline form, and has the empirical formula $C_{11}H_{22}N_2O_4$. It is prepared in two kinds of tablets, one for hypodermic injection containing $\frac{3}{10}$ gr. of clavine and $1\frac{1}{4}$ grs. sodium chloride, the other for internal administration, containing the same quantity of clavin, but combined with sugar.

Cochineal, Notes on. E. M. Holmes. (*Pharm. Journ.* [4], **22,** 314.) The commercial grades and the geographical sources of the insect are dealt with.

Colalin. (*Brit. Med. Journ.*, 1, **1906,** 687.) This is a new remedy for biliary insufficiency and is obtained by the hydrolysis

of glycocholic or taurocholic acids when choline and taurine are respectively formed, with colalin, which has the formula $C_{21}H_{10}O_5$. It is insoluble in water, but dissolves in alkaline solutions. It is administered in tablets each containing $\frac{1}{2}$ gr., four of which are to be taken daily. It also combines with the anthraquinone principle of cascara bark, forming a compound which has been named anthraquinone cholalate. This is prepared in tablets of $1\frac{1}{8}$ gr., equivalent to $\frac{1}{4}$ gr. of colalin.

Digitalis. E. Collin. (*Journ. Pharm. Chim.*, [6], **22,** 57.) Digitalis contains three glucosides, digitoxin, digitaleine and digitalin; all three act on the heart, but digitalin, the crystalline glucoside, is by far the most potent. *Digitoxin* is allied to the saponins; after extraction from the plant, it is almost deprived of toxic action, and therefore nearly inert therapeutically. If, however, it could be isolated directly from the fresh plant, it would probably prove much more powerful. It is soluble in water, and probably increases the solubility of the other glucosides, rendering aqueous infusions of the leaves more effective. *Digitalein* is identical with Kiliani's digitalin and with German *digitalinum verum*. It forms the principal constituent of Homolles' amorphous digatalin, and is the chief physiologically active principle of commercial amorphous digitalin. It is hydrolized into dextrose, digitalose, and digitaligenin. *Digitalin*, the crystalline glucoside, is the German digitoxin, and the "digitaline crystallized from chloroform" of the Codex. It is insoluble in water, and on hydrolysis, forms digitoxose and digitoxigenin. Other bodies of more or less doubtful activity have also been isolated.

It is well known that preparations of the crude drug, and specially the aqueous infusion, are 9 to 12 times more active than the amount of digitalin and digitalein they contain can be. Some investigators attribute this activity to the presence of digitonin, others regard it as due to an albuminoid, which increases the solubility of the glucosides. Cloetta has recently (*Year-Book*, **1905,** 184) announced the isolation of the soluble glucoside *digalene*, which is isomeric with digitalin.

Digitalis appears to be a plant which varies greatly in therapeutic potency with the soil and climate in which it grows. This has probably given rise to the opinion, which requires to be confirmed, that the cultivated plant is markedly less toxic than the wild one. Marked physiological reaction has been

obtained in France with a dose of infusion equivalent to 3 to 16 grs.; in Edinburgh, 160 grs. is said to be well tolerated; in London, 60 to 120 grs. are sometimes requisite to produce gastric disturbance. In Roumania, 180 grs. have not given rise to toxic effect. Dr. J. Bergeron has obtained better results with $1\frac{1}{2}$ to $2\frac{1}{2}$ grs. of the carefully gathered leaves from the Vosges district than his colleagues could effect with 16 grs. of leaves of unknown age or origin. Digitalis leaves are liable, as is well known, to be confused with the leaves of many other plants, such as *Digitalis grandiflora*, *D. ambigua*, *Verbascum nigrum*, *V. thapsus*, *V. phlomoides*, *V. lychnites*, *V. thapsiforme*, *Salvia sclarea*, *Conyza squarrosa*, *Piper angustifolium*, and *Symphytum officinale*. The distinctive characters of these adulterants are given, with woodcuts of the elements of the genuine drug and of the most frequent substitutes, *Inula conyza*, *Verbascum phlomoides*, *Piper angustifolium*, and *Salvia sclarea*.

Duret's Ba'sam, Authentic Formula for. (*Repertoire* [3], **18**, 104.) This preparation, widely presented for eczema, acne, sycosis, and other skin diseases, by Continental dermatologists, is said occasionally to cause irritation. Duret, to whom the prescription is due, states that this is not the case if the compound be made strictly according to the following recipe: Wood tar, 18; cade oil, 15; resorcin, 2; menthol, 5; guaiacol, 5; camphor, 40; precipitated sulphur (obtained by cooling a saturated solution in turpentine), 15; borax, 36; glycerin, 50; acetone, 80; castor oil, 40; lanoline, 100. The sulphur should be prepared precisely as indicated, and is heated in closed vessel with the tar, cade oil, castor oil and lanolin.

Estoral. (*Apoth. Zeit.*, **22**, 278.) The boric acid ester of menthol, in the form of a white crystalline powder with a faint odour of menthol, has been introduced as a harmless antiseptic. It has given success, as an insufflation, in chronic nasal catarrh; as it sometimes occasions a sensation of burning, it may be introduced up the nasal passages by means of a glass tube, or diluted with an equal quantity of milk sugar. Estoral is quite stable when dry, but on contact with moisture is decomposed into menthol and boric acid.

Ethyl Salicylate for Rheumatic Affections. Houghton. (*Merck's Jahresberichte*, **19**, 15.) Ethyl salicylate is preferable to

methyl salicylate or to oil of wintergreen for medicinal use, since it is markedly less toxic.

Eucalyptus Oil and Chloroform as a Vermifuge. L. P. Phillips. (*Lancet*, **170,** 285.) The original prescription of Hermann is thus modified: Eucalyptus oil, 2·5 Gm.; chloroform, 3·5 Gm.; castor oil, 40 Gm. Half of this is given to an adult, fasting, in the morning, and the other half in 30 minutes' time. Should depression occur after the first dose, the second is omitted. In younger or anæmic patients the dose is given in one-thirds with 25 minutes' interval. It may be repeated, if required, every other day. A saline purge should be given the night before treatment.

Eucalpytus Oil, Toxicity of. F. A. Upsher Smith. (*Pharm. Journ.* [4], **22,** 662.) Examination of a sample of eucalyptus oil of which half a wineglassful, probably about 6 drachms, taken in hot water, had caused death, showed that it contained 52·6 per cent. of cineol, and no phellandrene.

Eucodeine. (*Apoth. Zeit.*, **20,** 811.) Codeine methyl-bromide has been introduced under the name of eucodeine, with the claim that it is less toxic than codeine and does not occasion muscular cramp. It is given in tablet form in doses up to 5 centigrammes.

Eupththalmine. T. Mironescu. (*Merck's Jahresberichte*, **19,** 76.) This is the more convenient name for phenylglycolol-normal - methyl - β - vinyldiacetone - alkamine hydrochloride, $C_{17}H_{25}N_3.HCl$. It is a white crystalline powder readily soluble in water. It is a useful mydriatic with a very low toxic action, and is used as a substitute for atropine.

Fatty Acids, Free, Action of Hypodermic Injections of. J. Camus and P. Paigniez. (*Comptes rend.*, **141,** 737.) When free fatty acids are injected hypodermically they give rise to great inflammation and subsequent ulceration. The lesions produced, especially in the lung tissue, exactly resemble the tubercles of phthisis. It is considered probably that the latter are occasioned by the free fatty acids liberated by the action of tubercle bacilli. Tuberculin is found to contain notable quantities of these acids in the free state.

Formicine. (*Nouveaux Remèdes*, **22,** 98.) A product of the action of formaldehyde on acetamide has been put forward, under the name of formicine, as an antiseptic. It is a crystalline hygroscopic body ; in consequence of its deliquescent nature it is met with in commerce in the form of a thick syrupy liquid, very soluble in water, oil, and other solvents. Its solutions, stable at ordinary low temperatures, begin to decompose at 25°C., and rapidly liberate formaldehyde at higher temperatures. Its 2 per cent. solution in glycerin forms an efficient deodorant and disinfectant for purulent cavities and surfaces, and it has been employed with success in the treatment of tubercular affections of the joints.

Gangrene Caused by Carbolic Dressings to the Extremities. J. Carles and — Cotte. (*Répertoire* [3], **17,** 304.) The general use by the public of lotions and dressings of phenol preparations for wounds on the extremities is often the cause of serious complications. It cannot be too widely known that phenolic gangrene, sometimes resulting in the loss of a limb, may result from such ignorant use, even when comparative weak solutions of phenol are applied on a compress. Phenol solutions should never be applied for long as dressings to wounds or cuts on the hands and feet, except under careful medical supervision. The danger is the more insidious since the action is painless, the phenol acting, as is well known, as an analgesic.

Gentiopicrin, Physiological Action of. G. Tanret. (*Lancet*, **170,** 173.) The natives of Corsica prefer gentian to quinine for the treatment of malaria. It is found that gentiopicrin has distinct antiperiodic action. It acts as a poison on infusoria, although it is only a feeble antiseptic. It is without toxic action on mammals and is slowly eliminated by the urine. In doses of 22 grs. taken fasting it is a strong aperient ; in larger doses it acts as a drastic, but almost painless purgative. It does not affect the temperature of healthy subjects, but acts as an antithermic in malarial fever. It has been tried in sleeping sickness without result.

Guaiacol Cacodylate. — Burlureaux. (*Bull. gén. de Thérap.*, **151.**) This compound is prepared by fusing together equal molecular weights of guaiacol and cacodylic acid. After cooling, the mass is dissolved in alcohol and crystallized.

It forms a white deliquescent salt, very soluble in alcohol, glycerin and oil; soluble 1 : 20 in water at normal temperature, but much less soluble in colder water, so that in winter the solution readily deposits oily droplets of the cacodylate. This may be redissolved by the addition of a trace of alcohol. For hypodermic injections the addition of 10 per cent. of alcohol is therefore recommended. It is given in doses of 5 centigrammes per c.c. hypodermically in tuberculosis and in influenza. In the latter disease it has given extremely good results.

Iodan. E. H. Shield. (*Amer. Drugg.*, **48**, 11.) Goose fat which has for long been a popular domestic remedy, is receiving recognition as a valuable fatty vehicle for drugs intended for cutaneous application or for internal use. Among the latest preparations into which it enters is iodan, a 25 per cent. solution of iodine in the liquid portion of goose fat. It is claimed to form a stable iodine compound, which is readily absorbed. It is given internally in capsules, containing 5 or 10 minims of the preparation.

Hemlock Herb, German, Adulterated. D. Tunnmann. (*Pharm. Centralh.*, **46**, 879.) Only 6 samples of commercial dried German hemlock herb were found to be pure out of 10 examined. Two consisted entirely of *Æthusa cynapium*, and half another was composed of *Chærophyllum bulbosum*. One sample of good appearance yielded no conine.

Iodine Solution as an Antiseptic. N. M. Telontovitch. (*Voyenno Med. Journ.* through *Nouveaux Remèdes*, **21**, 331.) Weak aqueous solutions of iodine possess a powerful antiseptic action which does not appear to be generally appreciated. When treated with a 1 per cent. aqueous solution of iodine, gangrenous wounds are rapidly cleansed and healed. The same solution has given excellent results as an irrigation, for a case of complex fracture of the leg.

Iodomaisin.—Vaudin,—Donard, and H. Labbé. (*Journ. Pharm. Chim.* [6], **23**, 118). The combination of iodine with maisin, iodomaisin, is introduced as a means of administering iodine. It occurs as an amorphous yellowish hygroscopic mass, soluble in water and in alcohol. It differs from other iodo-albumin compounds in that the protein molecule is not modified.

It has been given with success in emphysema and in tertiary syphilis in doses of 1½ to 2 grs. per diem. It is perfectly tolerated.

Jaborandi Leaves, Commercial. E. W. Mann. (*Pharm. Journ.* [4], **21,** 788.) Of 5 samples of commercial jaborandi leaves examined only one gave a fair yield of alkaloid, 0·43 per cent. This yielded crystalline pilocarpine nitrate equivalent to 0·3 per cent. of that base. The sample was identified by E. M. Holmes as being apparently a mixture of *Pilocarpus pennatifolius*, *P. jaborandi* and *P. trachylopus*, or a hairy variety of *P. jaborandi*. One sample giving 0·26 per cent. of alkaloid was *P. racemosus*, and the others giving from 0·13 to 0·21 per cent., *P. pennatifolius*.

Lemon Juice as Antidote to Male Fern. (*Pharm. Zeit.*, **50,** 1035.) The free administration of fresh lemon juice is stated to counteract the toxic effect of male fern extract. The treatment is stated to have cured a patient who was collapsed after a dose of 186 grs. of oil of male fern.

Lentin. H. Unverricht and B. Boye. (*Merck's Jahresberichte*, **19,** 131.) This name has been given to chemically pure metaphenylene-diamine hydrochloride, which has been introduced as a remedy for chronic and acute diarrhœa. The dose for children is not more than ½ gr.; adults may take 1½ grs.; the maximum dose should not exceed 4½ grs.

Lithia-theobromine. E. Dumesnil. (*Journ. Pharm. Chim.* [6], **23,** 326.) A definite crystalline compound of lithia and theobromine, $LiC_7H_7N_4O_2$, is obtained by treating an excess of theobromine with lithium hydrate solution, filtering and evaporating *in vacuo* over H_2SO_4, and finally at 110°C. still *in vacuo*. The compound occurs in fine silky needles, soluble 2 : 1 in water. The solution becomes turbid, due to formation of Li_2CO_3 on exposure to the air. It is claimed to be 4 or 5 times more active therapeutically than the equivalent quantity of pure theobromine.

Mangrove Bark as a Remedy for Leprosy. (*Merck's Jahresberichte*, **19,** 183.) The bark of the West Indian and South American mangrove has had a native reputation as a febrifuge. It is stated that it is also a valuable remedy for leprosy. A fluid extract is prepared from the bark of the tree, at least 5 to

6 years old, of which a teaspoonful is taken at first, twice daily, increased by a spoonful at a time until, ultimately, 12 teaspoonfuls are taken per diem. At the same time external applications of 3 parts of the fluid extract and 7 parts of water are used locally, and the patient is bathed every evening for 15 to 20 minutes in a tepid bath, the water of which contains sufficient decoction of the bark to tint it red.

Mergal.—Riedel. (*Journ. Pharm. Chim.*, [6], **23**, 1903.) This name has been given to mercuric cholate $Hg(C_{24}H_{39}O_5)_2$. It occurs as a greyish powder, almost insoluble in water, but readily dissolved in solutions of alkali salts such as NaCl. Mergal 1, NaCl 2, and water 10 are shaken together until the mergal is dissolved; the solution may then be diluted, as required, with more water. The solutions are never quite clear, due probably to a trace of basic salts. Mergal is decomposed by alcohol, alkalies and acids.

Metallic Mercury, Danger of Subcutaneous Injection of. (*Lancet*, **1**, 1906 [1170] 465.) The Continental practice of injecting metallic mercury subcutaneously for the treatment of syphilis is strongly condemned. Two fatal cases of mercurial poisoning have recently been recorded as following this method of treatment. When mercury is thus given absorption takes place very slowly, and if symptoms of poisoning occur, the only remedy is excision of the part infiltrated with mercury. If employed at all, it should only be used with the greatest care.

Methylrhodin. E. Corsi. (*Merck's Jahresberichte*, **19**, 143.) Attention is again directed to the acetyl-salicylic acid methyl ester, which was introduced into medicine by Berlioz. It has been prescribed with success by Corsi for rheumatic affections and influenza, in doses of $7\frac{1}{2}$ to 15 grs., increased to 65 grs. or even 80 grs. in 24 hours. It is a white crystalline body, m.p., 54°C.

Myrrh, the Botanical Source of. E. R. Holmes. (*Pharm. Journ.* [4], **22**, 254.) It is shown that the opinion of Tschirch and Bergmann that *Commiphora playfairii* is the botanical source of myrrh is untenable. *Balsamodendron myrrha*, Nees (not *Commiphora myrrha*, Engler) is shown to be the true source of the drug. Figures of *Commiphora playfairii* and of other species with their characteristic fruits, are given and described.

Nocturnal Administration of Medicine.—Laufer. (*Journ. Pharm. Chim.* [6], 23, 216.) In therapeutics but little note is taken of the fact that the physiology and pathology of the night is distinctly different from that of the day. Certain morbid conditions, such as those of acute rheumatism, require that the remedial agents should be administered by night as well as by day. Drugs given at night have a markedly greater activi y, partly due to the fasting condition of the patient, and partly to the slackened elimination. In consequence, a more prolonged working of the drug is obtained. Therefore, an ordinary dose should be given at night, in fractions, conveniently one half at bedtime, the other half at midnight. Linossier confirms the fact that nocturnal medication is valuable for certain drugs which are rapidly eliminated; but for those which are slowly passed out of the system, such as digitalis, it is unnecessary. Le Gendre points out that nocturnal pathology is quite distinct from diurnal in cases of auto-intoxication; to illustrate the difference in the physiological process it is stated that the urine excreted at night has been found to contain substances which act on animals as excitants and convulsives; while the excretion of the day contains bodies with a narcotic action.

Novocaine. A. Einhorn. (*Apoth. Zeit.*, **20,** 871.) This name has been given to para-amidobenzoyl-diethyl-amino-ethanal mono-hydrochloride, $NH_2.C_6H_4.CO.OC_2H_4.N(C_2H_5)_2.HCl$. It occurs in white needles, m.p. 156; it dissolves in an equal weight of water forming a neutral solution. It is precipitated by alkali as an oily liquid which soon solidifies to a crystalline mass, but alkali carbonates do not precipitate it. Its aqueous solutions may be boiled without decomposing. In conjunction with adrenaline it forms a powerful anæsthetic and the action of the adrenaline is at the same time increased. A. Braun recommends that solutions of the following four strengths should be prepared for administration—

Novocaine	25 centigrammes	25 centigrammes	10 centigrammes	10 centigrammes
Physiological salt solution	100 c.c.	50 c.c.	10 c.c.	5 c.c.
Adrenaline solution 1 in 1000	5 drops	5 drops	10 drops	10 drops

It is convenient to prepare a 20 per cent. solution of novocaine, which may be diluted as required with physiological salt solution, and the adrenaline solution added.

Omorol. (*Pharm. Zeit.*, **51**, 514.) Omorol is a silver-protein compound in which the metal is so intimately combined that it does not react with chemical tests until the combination is broken up. It contains 10 per cent. of silver, and is a fine yellowish powder insoluble in water, but soluble to the extent of 3 per cent. in physiological salt solution; it is also dissolved by serum, mucus, and albuminous solutions. It is claimed to be an antiseptic of great penetrative power. For gonorrhœa it is employed as an aqueous suspension used by injection. It has also been employed with success as an application for diphtheria.

Ovogal. E. Woerner. (*Pharm. Zeit.*, **51**, 460.) Ovogal, a combination of ovalbumin with glycocholic and taurocholic acids, in the form of an insoluble yellowish green powder, has been introduced as a remedy for biliary insufficiency and hepatic calculi. It is given in doses of a teaspoonful to a tablespoonful suspended in fluid. Although generally insoluble it is dissolved with decomposition by alkaline solutions. To cover the taste, it may be mixed with sugar flavoured with peppermint oil, or prescribed in cachets or capsules.

Parisol. (*Therap. Monats.*, **19**, 639.) This is a condensation product of formaldehyde and saponified naphthaquinone, which is a clear, pleasant smelling liquid, readily miscible with water giving a cloudy mixture in the cold. It is claimed to be a very powerful bactericide, even superior to corrosive sublimate. It penetrates the skin well, and in 5 per cent. solution may be used as a substitute for ordinary sublimate antiseptic solution. In this strength it does not occasion irritation or eczema, like sublimate, nor gangrene, like phenol. Wounds should be treated with a 3 to 5 per cent. solution, then dressed with bandages moistened with 0·1 to 0·3 per cent. solution. It is specially serviceable in gynecological practice; for general use a 0·3 to 0·5 solution may be used instead of mercuric chloride.

Perborates. J. Bougault. (*Journ. Pharm. Chim.* [6], **22**, 221.) These salts, from their richness in oxygen and comparative stability in the crystalline state, have been suggested for medicinal use. Sodium perborate $NaBO_3 + 4H_2O$ is obtained by the action of H_2O_2 on $Na_2B_4O_7$ in the presence of an alkali, or by the action of sodium peroxide on boric acid, or by the

electrolysis of a solution, sodium orthoborate. The crystals are stable in the air, soluble in about 50 parts of water, the solution being alkaline, and evolving oxygen when heated. Other perborates described are those of potassium, ammonium, calcium and barium.

Picric Acid for Eczema. O. Meyer. (*Merck's Jahresberichte*, **19,** 9.) Picric acid has proved a valuable remedy for various forms of eczema, especially on the hands. It is applied either as a warm 1 : 200 or 1 : 100 aqueous solution, or as an ointment with zinc stearate and liquid paraffin, or combined with ordinary zinc starch-paste.

Polygonum aviculare as a Remedy for Tuberculosis. (*Nouveaux Remèdes*, **21,** 321.) The dried Russian herb, a reputed efficacious remedy for tuberculosis, is now found in large quantities in Continental commerce, under the name of *Homenaria*. The Russian drug is stated by Lebbin to be more active than that produced in Germany; the former contains a trace of more volatile oil than the latter, but less tannin and less resin.

Pepper as a Hæmostatic. — Pérugier. (*Bull. gén. de Thérap.*, **151,** 196.) Ordinary ground white or black pepper, as used for a condiment, which is always at hand in the household, is a prompt and certain hæmostatic for cuts and other bleeding wounds. Contrary to what might be supposed, its application is painless, and does not occasion any smarting. It is simply dusted thickly over the bleeding surface.

Proponal. E. Fischer and — von Mering. (*Apoth Zeit.*, **20,** 1,001, after *Med. Klin.*) Dipropylbarbituric acid $\begin{matrix} C_3H_7 \\ C_3H_7 \end{matrix}\!\!>\!C\!<\!\begin{matrix} CO-NH \\ CO-NH \end{matrix}\!\!>\!CO$ has been introduced as a hypnotic under the name of proponal. It occurs in colourless crystals, m.p. 145°C., very sparingly soluble in water, but easily dissolved in alkaline liquids. It is readily absorbed by the intestines, its hypnotic effects being produced in 15 to 40 minutes after administration. It is given in doses of $2\frac{1}{2}$ to $7\frac{1}{2}$ grs., as a powder, or suspended in any liquid.

Protocetraric Acid, Cetrarin, as an Anti-Emetic. A. Gigon. (*Bull. Comm.*, **34,** 185.) Protocetraric acid, also known as

cetrarin, is generally met with in the form of a greyish powder, with a characteristic odour. It is a powerful and efficient sedative, and controls the tendency to vomiting. Its toxicity is very low, the lethal dose for the dog being 0·6 to 0·7 Gm. per kilo. body weight. It appears to possess an elective action on the muscles of the digestive system; and is preferable to tincture of Iceland moss, since it is free from irritant action of that preparation. It is best prescribed in the form of a saturated alcoholic solution, of which 20 to 60 or even 100 drops may be given in 24 hours without occasioning inconvenience. It has given good results in vomiting of tuberculous patients in gastric migraine, in the vomiting of pregnancy or of hysteric origin, sea-sickness, and in other forms of gastric disturbance. A single dose of 20 to 30 drops should be given and repeated as required.

Protosal. (*Apoth. Zeit.*, 20, 1002.) Protosal is the glycerin-formalin ester of salicylic acid, an oily, colourless liquid; sp. gr. 1·344 at 15 C; readily soluble in alcohol, ether, chloroform and castor oil; less soluble in olive and sesame oils; insoluble in water, glycerin and vaseline. It is applied externally for rheumatic affections in the following form: Protosal, 10; alcohol 90 per cent., 1; olive oil, 20.

Prunus Serotina Bark, Spurious. E. M. Holmes. (*Pharm. Journ.* [4], 22, 315.) A description is given of a *Prunus* bark, recently imported as that of *P. serotina*. This official bark is stated to be very liable to substitution.

Quillaia Bark, New Form of. E. M. Holmes. (*Pharm. Journ.* [4], 22, 315.) A new form of quillaia bark which is now being largely imported, stated to contain less saponin than the true *Quillaia saponaria* bark, is described.

Quinine for Corneal Ulcer. — Lawson. (*Med. Press*, 81, 54.) An aqueous solution of 4 grs. of quinine sulphate in the ounce, dissolved by means of a trace of dilute H_2SO_4, is an excellent remedy for corneal ulcer. It is applied, by means of an eye bath, for 5 minutes, 4 or 5 times a day. Atropine is instilled twice daily and the eye is bandaged.

Rhubarb, Chinese, Powdered, Test to Distinguish from Powdered Rheum rhaponticum. A. Tschirch. (*Schweiz. Woch.*

through *Journ. Pharm. Chim.* [6], **22,** 175.) Ten Gm. of the powder is boiled in 50 c.c. of dilute alcohol (68 per cent.) for 15 minutes, then filtered; the filtrate is concentrated to 10 c.c. and shaken with 10 to 15 c.c. of ether. With Chinese rhubarb, the liquid, after standing for 24 hours, remains clear; with rhapontic rhubarb, however, a crystalline deposit of minute prismatic crystals of rhaponticin is formed. If this is collected, washed with water, and treated with H_2SO_4, it gives a purple-red colour, passing to orange.

Saiodin. E. Fisher and F. von Mehring. (*Apoth. Zeit.*, **21,** 163.) This is stated to be calcium mono-iodobehenate, $Ca2(C_{22}H_{12}O_2I)$. It is a colourless, tasteless, insoluble powder, becoming superficially yellow on exposure to light. It is given in doses of 15 grs., once to three times daily, in cases requiring iodine treatment.

Santyl. H. Vieth. (*Merck's Jahresberichte*, **19,** 185.) This is described as the "salicylic acid ester of sandal oil." It is an almost odourless and tasteless liquid, containing 60 per cent. of esterified santalol. It is claimed to be more effective for the treatment of gonorrhœa than sandal-wood oil, and is also useful in cystitis. The dose is 30 drops, 3 times daily, in milk.

Savin Leaves, Commercial, W. G. Freeman. (*Pharm. Journ.* [4], **21,** 829.) In this country the typical form of *Juniperus sabina* and the var. *tamariscifolia* are the kinds chiefly grown for medicinal use. In France the leaves of *J. phœnica* are substituted for those of *J. sabina*; *J. thurifera* var. *gallica* is also occasionally met with. The botanical and microscopical characters differentiating these species and varieties are described.

Scammony Resin. P. Guigues. (*Journ. Pharm. Chim.* [6], **22,** 241.) At the present time scammony root is found in commerce which contains two resins, one soluble, the other insoluble in ether. This insoluble resin is dissolved to a certain extent in a strong ethereal solution of the soluble resin, so that on adding more of the solvent, it is precipitated. This solution of one resin by the other in ethereal solution vitiates the ether test; moreover, the ether test allows the substitution of the resin of fusiform jalap for that of scammony, and does not detect admixture of colophony, sandarac, mastic and other ether-soluble

resins. It is considered probable that this change in character of scammony resin derived from the root is due to the supply of the true *Convolvulus scammonium* having become exhausted, and that the root now gathered and sold as such is derived from another species. The ether test should be thus applied: About 5 Gm. of the resin is weighed off and treated with not less than 100 c.c. of anhydrous ether. The ethereal solution is decanted on to a tared filter, and the residue is again treated with more ether, which is filtered as before. When nothing more is dissolved, the insoluble residue is dissolved in alcohol and transferred to a small tared capsule. The alcohol is evaporated off, and the residue, dried at 100°, is weighed, together with the tared filter. It frequently happens that on mixing ether filtrates, a further precipitation occurs. At present, commercial brown resin of scammony is met with which contains 50 per cent. of insoluble resin when thus treated; and white scammony resin, 25 per cent. of ether-insoluble resin.

Silver Nitrate and Peruvian Balsam for Crural Ulcer. R. Petretto. (*Nouveaux Remèdes*, **21,** 309.) Silver nitrate, 1; Peruvian balsam, 20; simple ointment, 300. In most instances, a rapid cure of the ulcers follows the application of this ointment.

Sodium Cacodylate in Ophthalmic Practice. Galekowski. *Merck's Jahresberichte*, **19,** 7.) Sodium cacodylate has been employed in the form of an oily collyrium in keratitis and other affections of the eye, thus: Cocaine hydrochloride, 0·25 Gm.; sodium cacodylate, 0·12 Gm.; liquid paraffin, 15 Gm. One or two drops to be instilled into the eye twice or thrice daily.

Sodium Thiosulphate as an Ophthalmic Disinfectant. A. Trouseau. (*Merck's Jahresberichte*, **19,** 148.) A 5 per cent. solution of hyposulphite forms an excellent general antiseptic for use in ophthalmic cases. In keratitis, compresses soaked in the warm solution are applied for 25 minutes, 4 or 5 times a day. It is not so irritant as mercurial solutions, and more active than boric acid lotion.

Solurol, a new Uric Acid Solvent. A. Zucker. (*Pharm. Centralh.*, **46,** 702.) This name is given to thyminic or nucleotinphosphoric acid, $C_{30}H_{46}N_4O_{15}\cdot 2P_2O_5$, which is formed from nucleinic acid by splitting off xanthine derivatives. It is con-

sidered by Minkowski that this body is the natural solvent of uric acid, with which it combines to form a compound, from which, he states, the uric acid is not again liberated by reagents. Fernier has confirmed the action of solurol as a solvent of uric acid. It is a brown, amorphous, tasteless powder, soluble in tepid water. It is given in doses of 4 grs., several times daily, in tablet form.

Spigelia marilandica, Adulterants of. W. W. Stockberger. (*Proc. Amer. Pharm. Assoc.*, **1905,** 324.) As previously recorded (*Year-Book*, **1904,** 244), the roots of *Ruellia ciliosa* are frequently gathered for spigelia. The recorded adulteration of pink root with the root of *Phlox carolina* is not correct; the adulterant attributed to the latter being really *Ruellia* root. Cystoliths, which are present in *Ruellia*, are not found in *Phlox* or in *Spigelia*. Starch is present in *Spigelia*, and is absent in both *Ruellia* and *Phlox*. Spigelia root, which does not react for starch, should therefore be regarded with suspicion. The histological characters which have been previously published as distinguishing *Phlox* are those of *Ruellia*. [See *Year Book*, **1891,** 160.]

Strophanthus, Commercial History of. E. M. Holmes. *Pharm. Journ.* [4], **22,** 312.) A detailed account of the history of the drug and its substitutes is given.

Sugar for Skin Affections. — Hodara. (*Gaz. des Hôpitaux*, through *Bull. Comm.*, **33,** 325.) The following ointment gives good results in vesicular eruptions: Lanoline, 2; vaseline, 2; powdered white sugar, 2; zinc oxide, 1; glycerin, 1; precipitated sulphur, 1. In seborrhæic eczema the following is prescribed: Lanoline, 30; vaseline, 30; powdered white sugar, 20; glycerin, 10; precipitated sulphur, 10; chrysarobin, 1 to 2.

Tannobromin. — Aufrecht. (*Pharm. Zeit.*, **50,** 880.) This is a compound formed by the action of formaldehyde on dibromo-tannin. It is introduced as a remedy for baldness and other affections of the scalp. It is insoluble in water, but dissolved by alcohol and alkali carbonates. It occurs as a reddish-yellow powder, with a slight, peculiar odour.

Thermiol. F. Zernik. (*Apoth. Zeit.*, through *Journ. Pharm. Chim.* [6], **22,** 69.) A 25 per cent. solution of sodium phenylpropiolate has been introduced into pharmacy under this

name, as a remedy for tuberculosis and for throat affections. It is chiefly used in the form of inhalations in 1 to 3 per cent. solutions.

Theocine, Toxicity of. E. Allard. (*Nouveaux Remèdes*, **21,** 453.) Theocine (*Year-Book*, **1903,** 256) has been found to possess marked toxic properties, two deaths being attributed to it. Schlesing and Stosz have previously recorded serious symptoms following its use, but in these cases without fatal results. *Post-mortem* examination showed that the gastric mucous membrane was hypertrophied, and that sanguineous effusions into the stomach had occurred. In each case convulsions preceded death. Experiments with animals showed that theocine produced all these symptoms. These results confirm the observations of Pouchet and Chevalier.

Urocitral. (*Journ. Pharm. Chim.* [6], **22,** 71.) This is stated to be a definite compound of theobromine with sodium citrate, having the formula $C_7H_7N_4O_2Na{\cdot}C_3H_4(OH)(COONa)_3$. It is a white powder, soluble in water, with a saline, bitter taste. It acts as a powerful diuretic, and is stated to be superior to diuretine, since it does not contain salicylic acid. It is given in doses of 8 to 16 grs., in cachets or in solution. It should not be prescribed with syrups or acids, or a portion of the theobromine may be precipitated.

Vermilion Ointment for Herpes tonsurans. O. Lassar. (*Merck's Jahresberichte*, **19,** 109.) Red mercuric sulphide is rarely prescribed, yet it is an active and efficacious remedy in certain skin diseases, such as contagious impetigo and herpes tonsurans. It is prescribed thus: Vermilion, 1; sublimed sulphur, 24; yellow vaseline, 100; perfumed with bergamot oil.

Viferral. (*L'Union pharm.*, **46,** 526.) Under this name a new polymer of chloral, obtained by the action of pyridine on anhydrous chloral, has been introduced as a hypnotic. It is stated to retain the therapeutic properties of chloral, without its drawbacks. The average dose for adults is 12 to 16 grs., but as much as 30 grs. has been given without harm. It is prescribed with success in all cases of insomnia of nervous origin, where the excitement, or pain, is not too acute. Prolonged use renders the patient less susceptible to its influence.

In consequence of its slow solubility in water and its unpleasant taste, it is prescribed in cachets.

Xylol for Smallpox. (*Merck's Jahresberichte*, **19,** 229.) Pure xylol is stated to be a valuable remedy in the treatment of smallpox. K. Wischnewski obtained good results with doses of 15 to 20 drops, given 4 to 6 times daily, in red wine. J. Belin has given in slight cases 40 to 70 drops, and in severe attacks 90 to 120 drops a day; for children, a daily dose of 20 drops. The mortality under xylol treatment fell to 15 per cent. of the cases in a smallpox hospital; previous to the commencement of the treatment it had been 31 per cent.

Zinc Peroxide for Psoriasis. Herxheimer. (*Bull. gén. de Thérap.*, **151,** 154.) Zinc peroxide is found to be valuable in the treatment of psoriasis, in the form of a 10 per cent. ointment. This should be prepared with a vaseline basis, since with animal or vegetable fats the oxygen evolved quickly causes rancidity and renders the ointment very irritating. It has the great advantage over chrysarobin ointment of not staining the skin or the linen.

Zymphene. — Fiquet. (*Journ. Pharm. Chim.*, **22,** [12], 543.) Sodium meta-oxycyanocinnamate, obtained by neutralizing the acid with sodium bicarbonate, occurs in the form of yellowish crystalline tablets, soluble in water and in alcohol. It is given as a stomachic and digestive tonic, to increase the appetite and stimulate the digestive organs, in doses of 8 grs. In large doses it acts as a purgative.

PHARMACY

PART III

PHARMACY

Absorbent Cotton Wool. — Budde. (*Bull. Pharm. du Sud-Est*, **10**, 463, after *Bull. Soc. royal. Pharm. de Brux.*) Absorbent cotton is generally prepared by Link's process, which consists in boiling the raw fibre with dilute soda, removing excess of soda with acid, bleaching with chlorinated lime, washing with soap, and decomposing the soap with dilute acids. The liberated fatty acids remain fixed on the fibres. It is the presence of these acids which causes the wool to crackle when rubbed between the fingers. Such wool often has a greater absorptive power for water than wool which does not crackle. To determine the amount of these fatty acids, 5 Gm. of the sample is extracted for 6 hours in a Soxhlet with anhydrous ether which has been kept over caustic potash. The ethereal extract is treated with an equal volume of absolute alcohol and titrated with N/NaOH solution, using phenolphthalein as indicator. Each c.c. used=0·284 Gm. of stearic acid. The amount of free fatty acids found in commercial absorbent cottons varies from 0·115 to 0·75 per cent., in terms of stearic acid. When the amount falls below 0·15 per cent., the wool does not crackle. An addition of more stearic acid increases the absorbent power of the wool; as much as 5 per cent. does not appreciably diminish it. The presence of these fatty acids is quite unobjectionable for wool intended for impregnation with $HgCl_2$. The process of soaping in the preparation of fat-free cotton is absolutely necessary. The presence of 0·35 to 0·4 per cent. of fatty acid, in terms of stearic acid, may be tolerated in absorbent cotton wool.

Acamulsia. (*Amer. Drugg.*, **48**, 230.) This compound emulsifying powder has the following composition: Powdered acacia, powdered tragacanth, sugar, starch, of each 5; boric

acid, 1. Mix intimately. Use 1 part of powder to every 32 parts of emulsion to be made. Eight ounces of the oil to be emulsified is put into a dry 32 oz. bottle, and shaken up with half an ounce of the acamulsia; when evenly suspended, 8 ounces of water are added at once, and the mixture is well shaken until a perfect emulsion is formed.

Acid Cosmetic Lotion: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 479.) Acetic acid, 30 per cent., 5; simple tincture of benzoin, 5; spirit of camphor, 5; tincture of red sandal wood, 7·5; alcohol, 77·5.

Aletris Cordial. Raubenheimer. (*Pharm. Zeit.*, **51,** 405.) *Aletris farinosa* root, 60; *Gaultheria procumbens* leaves, 60; *Nepeta cataria* herb, 30; *Viburnum opulus* bark, 30; *Caulophyllum thalictroides* root, 15; cinnamon bark, 7·5; bitter orange peel, 3·75; caraway fruits, 1·875; white sugar, 300; alcohol 94 per cent., 312; water, q.s. Reduce the drugs to medium fine powder. Mix the alcohol with an equal volume of water, moisten the powder therewith, then pack in a percolator. Percolate with this menstrum, then with water alone, until the percolate measures 800. In this dissolve the sugar and add enough water to make the final volume 1,000. Then filter.

Alkaline Glycerol of Thymol: Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 447.) Sodium bicarbonate, 100 grs.; borax, 200 grs.; sodium benzoate, 80 grs.; sodium salicylate, 40 grs.; menthol, 2 grs.; oil of *Pinus pumilio*, 4 ♏; wintergreen oil, 2 ♏; thymol, 4 grs.; eucalyptol, 12 ♏; alcohol 90 per cent., 4 fl. drms.; glycerin, 2 fl. oz.; solution of carmine, 40 ♏; distilled water to make 20 fl. oz. Dissolve the salts in the water; add the glycerin and solution of carmine; dissolve the oils and thymol in the alcohol, and mix.

Aloes, Compound, Decoction of. F. H. Alcock. (*Pharm. Journ.* [4], **22,** 282.) The deposit which forms in this preparation is found to be largely composed of the colouring matter of the cochineal, from the compound tincture of cardamoms, which is thrown out as a fine carmine lake. It is suggested to modify the formula, using simple aromatic tinctures and omitting the cochineal.

American Mouth Wash. Hamburg Formulary. (*Apoth. Zeit.*, **21,** 476.) Dilute sulphuric acid, 2 ; distilled water, 60 ; tincture of red sandal wood, 75 ; mix and add to otto of rose, 0·2 ; Peruvian balsam, 0·8 ; tincture of pyrethrum, 25 ; tincture of cinnamon, 25 ; simple tincture of benzoin, 50 ; dissolved in alcohol 90 per cent., 762.

Anhalt Water : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 466.) Eugenol, 1 ; cassia oil, 1 ; fennel oil, 1 ; nutmeg oil, essential, 1 ; rosemary oil, 1 ; turpentine oil, 10 ; alcohol, 90 per cent., 110.

Anti-rheumatic Cotton : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Eugenol, 12·5 ; thyme oil, 12·5 ; rosemary oil, 25 ; balsam of Peru, 25 ; tincture of red sandal wood, 50 ; oleo-balsamic mixture, 100 ; alcohol, 90 per cent., 775. Absorbent cotton wool is impregnated with the mixture and dried at ordinary temperatures.

Apomorphine Hydrochloride, Solubility of. D. B. Dott. (*Pharm. Journ.*, **22,** 345.) The solubility in water at 60°F. is 1 in 59 ; in alcohol, 90 per cent., 1 in 51. Solubilities should be determined, for practical and pharmaceutical purposes, by shaking up the finely divided solid with the solvent and determining the amount dissolved in a reasonable length of time.

Application for Loss of Hair. Strzyzowski. (*Journ. Pharm. Chim.* [6], **23,** 600.) Soft soap, 100 Gm. ; alcohol, 90 per cent., 50 Gm. ; glycerin, 15 Gm. Dissolve with gentle heat, filter, and dissolve in the filtrate β-naphthol, 5 Gm. ; essential oil of bitter almonds, 10 drops. Apply to the scalp night and morning. Wash off in 15 minutes.

Arnica and Witch-hazel Lotion. J. Fullerton. (*Drug. Circ.*, **50,** 162.) Arnica flowers, 4 ; powdered tragacanth, 2 ; quince seeds, 8 ; borax, $1\frac{1}{2}$; boric acid, 2 ; salicylic acid, 2 ; alcohol 90 per cent., 32 ; witch hazel water, 48 ; glycerin, 64 ; water, q.s. Boil the flowers in water, 128 ; strain and filter ; make a mucilage with the tragacanth, quince seed and water, 190 ; add the borax, boric acid and salicylic acid, and strain. Mix the two solutions ; add enough water to make the volume 336, then add the alcohol, glycerin and witch-hazel water.

Aromatic Elixir : Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 447.) Oil of bitter orange, 40 ♏. ; oil of lemon, 10 ♏. ; oil of coriander, 4 ♏. ; oil of aniseed, 1 ♏. ; alcohol, 90 per cent., 8 fl. oz. ; syrup, 12 fl. oz. ; kaolin, ½ oz. ; distilled water to make 40 fl. oz. Dissolve the oils in the alcohol, add the solution to the syrup with constant agitation, then add the water, mix in the kaolin, and filter. *Dose*—½ to 1 fl. drm.

Aromatic Solution of Ammonia : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Alcohol, 90 per cent., 130 ; solution of ammonia, 66 ; lemon oil, 1 ; essential oil of nutmeg, 1 ; marjorum oil, 1 ; eugenol, 1 ; mix and set aside. When it has developed a red colour, filter.

Aromatic Waters, Preparation of. W. S. Glass. (*Pharm. Journ.* [4], **22,** 344.) The preparation of the various aromatic waters is recommended by shaking the essential oil with hot water, and filtering, when cold, through a double-wetted filter paper. The oil is used in the proportion of 1 ♏. to the ounce of water, except in the case of rose and neroli, when ½ ♏. to the ounce is used.

Arrhenal and Alkaloidal Salts, Incompatibility of. D. Vitali. (*Journ. Pharm. Chim.* [6], **22,** 227.) Sodium methylarsenate, or arrhenal, gives precipitates with aqueous solutions of alkaloidal salts. This is not due to the alkalinity of the arrhenal, but to double decomposition, methylarsenate of the base being precipitated. Many of these alkaloidal methylarsenates are microcrystalline, and occur in characteristic forms.

Artificial Mineral Water Salts of the New Dutch Pharmacopœia. (*Pharm. Centralh.*, **47,** 423.) *Carlsbad Salts.* Potassium sulphate, 2 ; sodium chloride, 18 ; sodium bicarbonate, 36 ; dried sodium sulphate, 44. *Ems Salts.* Dried sodium sulphate, 7 ; potassium sulphate, 13 ; sodium chloride, 325 ; sodium bicarbonate, 655.

Hunyadi Janos Salts.—Magnesium sulphate 950 is heated until the weight is 500 ; this residue is powdered and mixed with sodium chloride, 50 ; dried sodium sulphate, 450.

Vichy Salts. Sodium phosphate 40 is heated until the weight of the residue is 16 ; it is then powdered and mixed with

potassium sulphate, 50; sodium chloride, 80; sodium bicarbonate, 854.

Wildungen Salts. Dried sodium sulphate, 5; potassium sulphate, 10; calcium carbonate, 240; magnesium carbonate, 240; sodium bicarbonate, 225; sodium chloride, 280.

Aspirin, Incompatibility of, with Potassium Iodide. W. Duncan. (*Pharm. Journ.*, 22, 346.) When prescribed with potassium iodide, aspirin at first forms HI, which ultimately liberates free iodine under the influence of light and air.

Behn's Collyrium: Hamburg Formulary. Salicylic acid, 1; zinc sulphate, 2; opium water, 77; water, 920. [Opium water is thus prepared: Powdered opium, 1; water, 10; distil, 5.—Ed. *Year-Book.*]

Belladonna Plasters, Poisoning by. Doland. (*Amer. Journ. Med. Sci.*, through *B.M.J. Epit.*, 1906, 1, 88.) Three cases of poisoning by belladonna plasters are recorded. Although the symptoms were severe, recovery followed the removal of the plasters in each case. In each instance, an erythematous eruption was caused on the parts covered by the plaster. Since these plasters are often self-applied, severe symptoms of atropine poisoning may occur before the physician is consulted; but, atropine being rapidly eliminated, the removal of the plaster is usually followed by complete cure, although the administration of a physiological remedy may be sometimes necessary.

Bismuth Mixture, Compound: Bournemouth Formulary. (*Pharm. Journ.* [4], 21, 448, and 22, 385.) Bismuth citrate, 320 grs.; solution of ammonia, q.s.; chloroform, 32 ℿ.; tincture of nux vomica, 1 fl. oz.; dilute hydrocyanic acid, 128 ℿ.; solution of carmine (Martindale), 32 ℿ.; distilled water, sufficient to produce, 8 fl. oz. Rub the bismuth citrate with a little water, add solution of ammonia until the salt is just dissolved, and make up to 6 oz. with distilled water. Dissolve the chloroform in the tincture of nux vomica, and add to the bismuth solution, then add the solution of carmine and filter; wash the filter paper with sufficient distilled water to produce with the hydrocyanic acid 8 fl. oz. of finished product. (Each fl. drm. is equi-

valent to 1 drm. of the B.P. bismuth solution, 15 ℥. of spirit of chloroform, 7½ ℥. of tincture of nux vomica, and 2 ℥. of hydrocyanic acid.) *Dose*—½ to 1 drm.

Bismuth Mixture, Compound, with Morphine : Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 448.) Morphine hydrochloride, 1 gr. ; compound bismuth mixture, 3 fl. oz. Dissolve. (Each fluid drachm contains $\frac{1}{24}$ gr. of morphine hydrochloride.) *Dose*—½ to 1 drm.

Bismuth Mixture, Compound, with Pepsin : Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 448, and **22,** 385.) Bismuth citrate, 320 grs. ; solution of ammonia, q.s. ; soluble scale pepsin, 64 grs. ; chloroform, 32 ℥. ; tincture of nux vomica, 1 fl. oz. ; dilute hydrocyanic acid, 128 ℥. ; solution of carmine (Martindale), 32 ℥. ; distilled water sufficient to produce 8 fl. oz. Rub the bismuth citrate with a little water, add solution of ammonia until the salt is just dissolved, and make up to 4 oz. with distilled water. Dissolve the pepsin in 2 oz. of water and add to the bismuth solution, then add the chloroform dissolved in the tincture of nux vomica, and the carmine solution, filter and wash the filter paper with sufficient water to produce, with the hydrocyanic acid, 8 fl. oz. of finished product. Each fl. drm. is equivalent to : Solution of bismuth, 1 drm. ; spirit of chloroform, 15 ℥. ; tincture of nux vomica, 7½ ℥. ; pepsin, 1 gr. ; hydrocyanic acid, 2 ℥. *Dose*—½ to 1 drm.

Blood-purifying Pills : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Extract of aloes, 2 ; dried purified ox-gall, 1 ; powdered white Castile soap, 1. Mass with glycerin, 4. Each 20 Gm. of mass is divided into 100 pills.

Borated Casein Massage Cream. J. F. Dulaney. (*Proc. Amer. Pharm. Assoc.*, **1905,** 431.) Skimmed milk, 1000 ; borax, 65 ; sulphuric acid, 20 ; solution of carmine, 1. Spirit of bitter almond (1 : 10), 10 ; spirit of neroli (1 : 20), 10 ; boric acid, q.s. Dissolve the borax in the milk with gentle heat, set aside for 24 hours and strain through muslin, and dissolve boric acid in the strained liquid to saturation ; again strain and add the carmine solution, then, gradually, with constant stirring, the sulphuric acid. Collect the precipitate in a muslin strainer and wash with a saturated aqueous solution of boric acid. Express

the excess of liquid and incorporate the spirit. Put up in wide mouth bottles and seal.

Boric Acid Dusting Powder : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Boric acid in fine powder, 1 ; French chalk in fine powder, 2 ; rice starch in fine powder, 7.

Bromides, Effervescent : Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Ammonium bromide, 40 ; potassium bromide, 80 ; sodium bromide, 80 ; sodium bicarbonate, 100 ; citric acid, 38 ; tartaric acid, 44·5 ; sugar, 17·5. Mix and dry at a gentle heat. Moisten with absolute alcohol, granulate through a sieve, and dry at 40°C.

Burow's Mouth Wash : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 467.) Spirit of peppermint, 6 ; dilute acetic acid, 20 ; aluminium acetate solution, 200 ; water, 774.

Calamine Ointment : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 466.) Red bole, 5 ; calamine, 20 ; yellow beeswax, 25 ; olive oil, 50.

Calcium Phosphate Milk with Iron : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) To a solution of sodium pyrophosphate 100 in water 2,000, add a mixture of ferric chloride solution, sp. gr., 1·280, 100 ; calcium chloride solution, 1 : 2, 50 ; and water, 2,000. The precipitate is washed with water, collected on a filter, further washed with little water, then mixed with sodium phyrophosphate 0·5, simple syrup 400, and q.s. water to make the weight 2,000.

Calcium Phosphate Milk : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Calcium chloride crystals 3 is dissolved in water 200, and precipitated with a solution of sodium phosphate 10, in water 200 ; the precipitate is washed with water by decantation, and drained until the weight is 200.

Camphor and Caffeine for Hypodermic Injection. — C l a r e t. (*Bull. Comm., November,* **1905.**) To 3 c.c. of sterilized glycerin add 1 c.c. of the following solution : Caffeine, 0·25 Gm. ; sodium salicylate, 0·25 Gm. ; distilled water, q.s. to make 1 c.c. To this mixture add 1 c.c. of spirit of camphor. The injection thus

prepared will keep well for several months. (See also *Year-Book*, **1905,** 240.)

Camphor Liniment, Assay of. W. B. Cowie and W. Dickson. (*Pharm. Journ.* [4], **22,** 281.) The expression of the camphor in terms of weight to volume is advocated, and the sample is heated to 150°C. The sp. gr. is first taken; then a weight equivalent to 10 c.c. is weighed off into a suitable beaker. A weight of olive oil of known sp. gr. equal to 8 c.c. is also weighed off into a similar beaker; this represents the oil in the liniment, without the camphor. Both are heated at 150°C. on a sand bath until constant in weight. The loss of weight in the oil alone is deducted from that observed with the liniment, thus giving a more correct loss for camphor.

Carbolic Acid Ointment. P. Boa. (*Pharm. Journ.* [4], **22,** 342.) The official formula is defended, and considered to afford a satisfactory product.

Cascara Bark, Fluid Extract of Cascara, and Fluid Extract of Rhamnus frangula; Determination of Amount of Active Principles in. J. Warin. (*Journ. Pharm. Chim.* [6], **22,** 12.) *Cascara Bark.* In order to obtain the full amount of oxymethylanthraquinone bodies, present in cascara bark, in terms of emodin by the colorimetric method previously described for *Rhamnus frangula* bark (*Year-Book*, **1905,** 144), it is necessary to hydrolize the glucosides, since some of them are not directly soluble in alkaline solutions. Therefore 0·5 Gm. of the bark is boiled for 2 hours with 50 c.c. of 2 per cent. H_2SO_4 solution. When cold, the solution is shaken out with successive portions of ether, and the bulked ether washings again extracted in the same manner with 2 per cent. NaOH solution. This alkaline solution is then submitted to the colorimetric test. With the specimen of bark experimented with, the tint obtained was equivalent to 0·605 per cent. of emodin. The *fluid extract* of the same bark, similarly hydrolized and treated, gave results equivalent to 0·59 per cent. of emodin. A *bitterless fluid extract*, prepared according to the official method of the Swiss Pharmacopœia, gave the practically identical figure of 0·595 per cent. With fluid extract of *Rhamnus frangula*, hydrolysis previous to assay was not found to be necessary, a yield of oxymethylanthraquinones equivalent to 0·755 of emodin being

yielded by direct action of the alkaline liquid and 0·76 per cent. after hydrolysis with acid. It is noteworthy, however, that the original *R. frangula* bark contained the equivalent of 3·5 per cent. of emodin; showing therefore that but a relatively low percentage of the active principles was extracted compared with those removed from *R. purshianus* bark. This is probably due to the fact that the active bodies are not soluble in the menstruum employed to a greater extent than 0·76 per cent. It is also evident that the method of the Ph. Helvet. of preparing the bitterless fluid extract does not diminish the amount of oxymethylanthraquinones.

Casein Massage Cream. B. C. Cooban. (*Bullet. of Pharm.*, through *Amer. Drugg.*, **48**, 227.) Skimmed milk, 128 oz.; boiling water, 128 oz.; hydrochloric acid, 1 oz.; boric acid, 1 oz.; oil of bitter almonds, 20 drops; oil of rose geranium, 30 drops; oil of sweet almonds, ½ fl. oz.; solution of carmine, sufficient to tint. Mix the milk with the water; dilute the hydrochloric acid with 16 fl. oz. of water, and pour into the diluted milk, with constant stirring. Allow the mixture to stand for an hour, collect the precipitated casein on a cheese cloth, and drain. Return the mass to the precipitating vessel, and stir up thoroughly with 2 gals. of water. Wash with more water by decantation, until the washings are free from acid. Collect the precipitate on a strainer, press as dry as possible, and rub down in a mortar with the boric acid. Transfer to a cheesecloth bag and allow to hang suspended for 36 to 48 hours, with occasional squeezing. Transfer the granular casein to a mortar, add 1 oz. of dilute alcohol 60 per cent., rub down as smooth as possible, adding the oil of sweet almonds, the perfume and the colour. Then add sufficient water to form a soft paste, beat all together until uniformly mixed, then run through a paint mill. Bottle or put up in collapsible tubes at once, since it dries very rapidly. [See also p. 120.]

Catechu Injection, Compound : Hamburg Formulary. (*Apoth. Zeit.*, **21**, 477.) Zinc sulphate, 1; lead acetate, 2; tincture of opium with saffron, 4; tincture of catechu, 4; water, 189.

Chilblain Application : Hamburg Formulary. (*Apoth. Zeit.*, **21**, 467.) (1) Camphor, 2, is dissolved in tincture of benzoin, 20, and mixed with a solution of potassium iodide, 5; rose water,

30 ; dilute alcohol, 30 ; and Goulard's extract, 27 ; meanwhile, white Castile soap, 26, is dissolved in rose water, 30, and dilute alcohol, 69, per cent., 30 by warming, and added with the first mixture.

(2) An emulsion is made with Peruvian balsam, 15 ; powdered gum acacia, 10 ; phenol, 1 ; and water q.s. to make 100.

(3) Zinc sulphate, 2 ; rose water, 49 ; alcohol 90 per cent., 49.

(4) *Mutzenbecher's Chilblain Application.* Iodine, 3 ; camphor, 3 ; ether (methylated), 20 ; flexible collodion, 74.

Swedish or Russian Chilblain Liniment. Camphor, 4 ; gum tragacanth in powder, 10 ; Peruvian balsam, 10 ; tincture of opium with saffron, 10 ; potassium iodide, 16 ; glycerin, 950.

[*Tinct. opii crocata*, Ph. G. iv. is thus prepared : Opium in powder, 15 ; saffron, 5 ; cloves, 1 ; cassia bark, 1 ; alcohol 90 per cent., 70 ; water, 70 ; macerate 7 days. Ed. *Year-Book.*]

Chilblain Ointments : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) (1) Camphor in fine powder, 1 ; yellow vaseline, 9.

(2) Camphor in fine powder, 1 ; opium in fine powder, 1 ; tannin, 1 ; water, 1 ; Peruvian balsam, 2 ; lard, 14.

(3) Ichthyol, 1 ; elemi ointment, 3 ; yellow vaseline, 3 ; lard, 3.

Chrysarobin Ointment, Compound : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) Salicylic acid, 2 ; chrysarobin, 5 ; ichthyol, 5 ; yellow vaseline, 88.

Clemen's Solution : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Arsenious acid, 1 ; potassium carbonate, 1 ; water, 1 ; are boiled together until solution is effected ; water 40 is then added ; to the cold solution add bromine 2 and water q.s. to make the weight 100. Set aside, with occasional shaking until colourless. To be kept from the light. (See also *Year-Book*, **1896,** 353.)

Cod Liver Oil, Aromatic : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 466.) Cod liver oil, 980 ; vanillin, 0·1 ; cinnamon oil, 0·4 ; absolute alcohol, 19·5. Dissolve the vanillin and cinnamon oil in the alcohol and mix with the oil.

Cod-Liver Oil, Aromatic : Luxemburg Formulary. *Pharm. Zeit.*, **51,** 427.) Coumarin, 0·01 ; saccharin, 0·50 ; vanillin,

0·10; absolute alcohol, 5·4; lemon oil, 5·0; peppermint oil, 1·0; oil of neroli, 1·0; cod liver oil to make 1,000 parts by weight.

Cod-Liver Oil Emulsion. (*Apoth. Zeit.*, **20,** 750.) Essential oil of bitter almonds, 1; calcium hypophosphite, 17; Irish moss, 20; orange flower water, 180; glycerin, 260; syrup of balsam of Tolu, 260; cod liver oil, 600; water, q.s. to emulsify. Boil the Irish moss with water, 1,000 for 20 minutes, and strain; evaporate the strained liquor to 700. Mix the other ingredients, and pour the hot mucilage into the mixture; shake thoroughly for 5 minutes, then from time to time until cold.

Colchicum Tincture [Essence] Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Colchicum seeds, 1; guaiacum resin, 1; cardamoms, 1; ginger, 2; rhubarb, 2; alcohol 69 per cent., 40. [Macerate 7 days, strain, press and filter.]

Compressed Tablets, Preparation of. H. Rodwell. (*Pharm. Journ.* [4], **21,** 826. Further directions for manipulation of a very practical nature are given for the preparation of compressed tablets. (See also *Year-Books*, **1903,** 487; **1904,** 520.)

Concentrated Infusions. E. H. Farr and R. Wright. (*Pharm. Journ.* [4], **22,** 163.) Amounts of extractive from fresh infusions as found in those prepared by the authors and also those recorded by other investigators are given. Processes are given for the preparation of concentrated infusions of all the drugs of which fresh infusions are official, with the addition of chamomile and valerian, which are occasionally prescribed. Reviewing the whole class, the results obtained were generally favourable, the infusion prepared from the concentrated product approximating, within reasonable limits, to the orthodox fresh infusion.

Cooling Ointment, Unna's: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) Vaseline, 2; wool fat, 10; rose water, 17; orange flower water, 17.

Copaiba Pills, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) White wax, 1; copaiba balsam, 2. Melt together and mix in powdered cubebs, 4. Divide each 12 Gm. of mass into 100 pills.

Cotton-Root Extract : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Coarsely powdered cottonroot bark, 2, is macerated for 3 days at 15–20°C. with occasional agitation in a mixture of alcohol 90 per cent., 2·5, and water, 7·5 ; then strained and pressed. The pressed marc is again macerated in a similar manner, with alcohol 1·5 and water 4·5, and again pressed and strained. The bulked liquids are then evaporated to a thick extract.

Crême de Vienne. (*Drugg. Circ.*, **50,** 208.) Borax, 4 ; zinc oxide, 4 ; oil of sweet almonds, 10 ; lime water, 10. Rub the zinc oxide with enough almond oil to form a paste ; dissolve the borax in the lime water and filter. Mix the rest of the almond oil with the filtrate, and add the mixture drop by drop with constant mixing to the zinc paste.

Cresol Disinfectant. P. Adam. (*Journ. Pharm. Chim.* [6], **22,** 145.) The use of soft soap (*Year-Book*, **1904,** 275.) in the preparation of cresol disinfectant is condemned, since the product gives an unsightly, lumpy mixture on dilution with water. The following formula is stated to give a liquid which is readily miscible with water in all proportions : Cresol, caustic soda solution (sp. gr. 1·332), equal parts by weight. Mix. For use, dilute with 100, 200, or 400 parts of water.

Dental Cement : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 467.) Sandarac, 14 ; mastic, 28 ; alcohol 90 per cent., 58. Dissolve.

Drying Liniment : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Glycerin 5, and water, 100, are added to a mixture of tragacanth, in fine powder, 2 ; alcohol 5, and the whole is heated, with constant stirring, until the weight is 100.

Elixir of Thyme with Bromides and Atropine. M. I. Wilbert. (*Proc. Amer. Pharm. Assoc.*, **1905,** 388.) Wild thyme (*Thymus serpyllum*), dried, 50 Gm. ; garden thyme (*Thymus vulgaris*), dried, 50 Gm. ; potassium bromide, 8 Gm. ; sodium bromide, 8 Gm ; ammonium bromide, 4 Gm. ; atropine sulphate, 2 *centigrammes* ; sugar, 200 Gm. ; menstruum, composed of alcohol 90 per cent., 2 volumes ; water, 8 volumes ; q.s. to produce 1,000 c.c. The herbs, in powder, are moistened with 150 c.c. of the menstruum, and macerated for 24 hours in a covered

vessel. The moist powder is transferred to a percolator, and more menstruum passed through it to give 750 c.c. of percolate. In this the bromides and the atropine sulphate are dissolved. The sugar is placed in a percolator and dissolved by passing the liquid through it. The volume is finally adjusted to 1,000 c.c. by more of the percolate from the herbs. The dose for pertussis, for children from 10 to 12 years of age, is a teaspoonful (5 c.c.); this contains one-tenth *millegramme* of atropine sulphate.

Emulgen. — Aufrecht. (*Journ. Pharm. Chim.* [6], **22,** 355.) This is a jelly-like, greyish mass, introduced as an emulsifying agent for oils and resins. One part will emulsify 5 parts of oil. It is stated to be a mixture of alcohol, 2; water, 10; glycerin, 4; gum tragacanth, 2; gum acacia, 1; and glutin, 1.

Emulsion of Cod Liver Oil with Hypophosphites: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 465.) Quillaia bark in fine powder, 0·4 Gm., is macerated in the cold with water 387 Gm., for 1 hour with frequent shaking; then calcium hypophosphite, 13 Gm.; sodium hypophosphite, 9 Gm., are dissolved in the liquid, which is then filtered. Meanwhile, cod liver oil, 450 Gm.; essential oil of bitter almonds, free from HCN, 6 drops; wintergreen oil, 6 drops; cinnamon oil, 6 drops; finely powdered gum tragacanth, 9 Gm.; finely powdered gum acacia, 6 Gm.; are mixed in a 2 litre bottle, and the filtered quillaia solution added to the mixture in one portion. The whole is then well shaken for at least a minute until a permanent emulsion is formed. Simple syrup, 150 Gm.; and alcohol, 90 per cent., 33 Gm.; are then added, and the whole again well shaken up.

Emulsion of Petroleum with Glycerophosphates: Bournemouth Formulary. (*Pharm. Journ.* [4], **22,** 385.) Liquid paraffin, 2 fl. oz.; gum acacia, in powder, 1 oz.; calcium glycerophosphate, 24 grs.; magnesium glycerophosphate, 12 grs.; potassium glycerophosphate, 12 grs.; sodium glycerophosphate, 12 grs.; citric acid, 5 grs.; spirit of chloroform, 2 fl. drms.; tincture of lemon, 1 fl. drm.; elixir of saccharin, 24 ℥.; distilled water, sufficient to produce 6 fl. oz. Triturate the liquid paraffin with the powdered gum and add, all at once, distilled water, 1½ fl. oz. Dissolve the glycerophosphates and the citric acid in distilled water, 1 fl. oz.; then add the other ingredients,

mix the whole with the emulsion, and add sufficient distilled water to make up the required quantity. *Dose*—1 to 4 fl. drms.

"English Liniment": Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Quillaia bark, in fine powder, 0·3, is shaken with water 300, and macerated for 1 hour. It is then filtered and mixed in a capacious bottle with oil of turpentine, 120; thyme oil, 30; finely powdered tragacanth, 8. The mixture is then well shaken until a uniform emulsion results.

Essence of Sarsaparilla, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Sarsaparilla, 125; rhubarb, 40; sassafras, 10; guaiacum wood, 10; licorice root, 10; mezereon bark, 7; all coarsely disintegrated, are macerated for 1 hour with borax, 4; potassium carbonate, 4; boiling water, 1,200; then strained and evaporated to 820. To this are added potassium iodide, 10; glycerin, 100; and alcohol 90 per cent., 100. Set aside, then filter.

Eucalyptus Essence: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Eucalyptus oil, 2; peppermint oil, 4; tincture of red sandal wood, 5; tincture of eucalyptus, 50; water, 439; alcohol 90 per cent., 500.

Eucalpytus Vinegar: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 466.) Eucalyptus oil, 2; peppermint oil, 2; tincture of sandal wood, 5; acetic acid 30 per cent., 45; water, 444; alcohol 90 per cent., 500.

Euonymin and Pepsin Solution: Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 448.) Pepsin, 32 grs.; diluted hydrochloric acid, 80 ♏; solution of euonymin, 4 fl. drms.; alcohol 45 per cent., 4 fl. drms.; chloroform water, to produce 2 fl. oz. Mix. Each fl. drm. contains 2 grs. of pepsin and 1 gr. of euonymin. *Dose*—1 fl. drm.

Euonymin Solution: Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 448.) Euonymin, 32 grs.; alcohol 45 per cent., 1 fl. oz.; oil of coriander, 4 ♏. Dissolve the euonymin and oil of coriander in the alcohol and filter. Each fl. drm. contains 4 grs. of euonymin. *Dose*—15 to 30 ♏.

Figs, Syrup of : Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Senna pods, 6 ; figs, 12 ; water, 58 ; macerate for 12 hours, then strain. In 33 parts of the strained liquor dissolve sugar, 45 ; boil and clarify ; when cold, add orange flower water, 10 ; alcohol 90 per cent., 20.

Floricin. G. Fendler. (*Apoth. Zeit.*, **20,** 627.) Floricin is the viscous oily residue obtained by heating castor oil until about 5 per cent. has distilled over. It is miscible with mineral oils, and is capable of absorbing a certain amount of water. When combined with 25 to 30 per cent. of hard paraffin, it affords permanent emulsions with aqueous solutions. It is also used as a basis for ointments.

Fluid Extract [Essence] of Buckthorn : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Buckthorn bark, coarsely disintegrated, 10 ; water, 50. Heat together on the water bath for several hours ; strain, press and evaporate the liquid to 8 ; add to it tincture of orange peel, 1 ; alcohol 90 per cent., 1.

Fluid Extract [Essence] of Sarsaparilla : Hamburg Formulary. *Apoth. Zeit.*, **21,** 477.) Coarsely disintegrated sarsaparilla, 10 ; water, 20. Macerate and heat on the water bath for 2 hours ; strain and evaporate to 9 ; to this add alcohol 90 per cent., 1.

Freckle Lotions. (*Amer. Drugg.*, **48,** 324.) (1) Dilute nitric acid, 2 drms. ; alcohol 90 per cent., 3 fl. oz. ; white rose essence, ½ fl. oz. ; neroli oil, 10 ♏. Mix and add hydrogen peroxide, 2 fl. oz. ; glycerin, 3 fl. oz. ; liquid cochineal, q.s. to tint ; water to make 40 fl. oz. Allow to stand for 3 weeks, then filter and bottle off.

(2) Zinc oxide, 1 drm. ; calamine, 1 drm. ; white precipitate, 15 grs. ; glycerin, 2 drms. ; rose water to make 6 fl. oz.

(3) Zinc sulphocarbolate, 1 drm. ; glycerin, 3 fl. oz. ; alcohol 90 per cent., 2 fl. oz. ; rose water, 10 fl. oz.

(4) Zinc oxide, 3 drms. ; bismuth subiodide, 30 grs. ; dextrin, 2½ drms. ; glycerin, 3 drms. To be applied at night and washed off in the morning.

Galenicals, Home-made. M. H. Stiles. (*Pharm. Journ.* [4], **22,** 442.) Practical details, illustrated by woodcuts of improved pharmaceutical apparatus, and instructions on pro-

cesses and methods of manipulation, are fully given for certain tinctures and liquid extracts, confection and essence of senna, concentrated infusions, and other galenicals.

Gelatin Bases of the Netherlands Pharmacopœia Ed. IV. (*Pharm. Centralh.*, **47,** 399.) *Hard Gelatin Basis for Capsules for Copaiba Balsam.* Gelatin, 3 ; water, 6 ; glycerin, 1.

Soft Gelatin Basis for Castor Oil Capsules. Gelatin, 23 ; water, 32 ; glycerin, 45. Heat the gelatin in the water on the water bath until the former is dissolved, then add the glycerin.

Gelatin Capsules. J. A. Forret. (*Pharm. Journ.* [4], **22,** 195.) *Gelatin Mass.* Gelatin, in thin sheets, 16 ; simple syrup, 4 ; mucilage of acacia, 4 ; glycerin, 7 ; water, 30. Mix together the syrup, mucilage, glycerin and water, and soak the gelatin in the mixture ; when the gelatin has become uniformly soft, melt in a water-bath. The gelatin should be in thin sheets and of good quality.

Preparation of Capsule Cases. The capsule moulds are oval in shape, and may be made of tin, brass, or aluminium. The stems of the moulds are about 2 in. long, and are fixed to one side of a circular or square wooden or metal carrier ; to the centre of the other side of the carrier is fixed a stout handle. The sizes of capsules in common use are 3, 5, 10, 15, 20, 30, 60 and 90 ℳ., and it is convenient to have all the moulds on each carrier of the same size.

The gelatin mass is brought to a suitable temperature ; if too hot, the capsules will be too thin, and if too cold, they will be unnecessarily thick. A mass that has been in use for some time, and so has lost water by evaporation, will, of course, require a higher temperature than one freshly made ; a little experience will enable the operator to determine the proper consistence. On the top of the melted mass there may be a tough film, together with a little water from the vapour which condenses on the lid and drops on to the mass ; there may also be air-bubbles. The surface layer must, therefore, be carefully removed or drawn to one side before the moulds are dipped.

The moulds are wiped with a piece of cloth permeated with almond or olive oil, and dipped into the melted mass till they are well under the surface. They are then slowly withdrawn and rotated until the gelatin sets. When cold, the capsules are drawn from the moulds with the fingers, and are then trimmed

with a knife or scissors. To facilitate closing, the capsules are trimmed so as to leave a short length of neck.

Filling the Capsules. In the filling of capsules the method adopted is determined by the nature of the material to be filled. Limpid liquids, such as turpentine and some of the essential oils, are conveniently capsuled by means of a syphon of rubber tubing, terminated by a pointed glass nozzle fixed at a convenient height, the flow being controlled by a spring- or screw-clip. Fluids like castor oil, and material of a semi-fluid or fatty consistence, are forced through a nozzle of the required calibre. There are many mechanical devices for filling capsules on the large scale; the simplest arrangement of all, however, is an ordinary glass syringe, the nozzle of which has been drawn out and cut to leave a point of a suitable bore, clamped at a convenient height; the capsules are held under the nozzle with one hand, while the piston-rod is manipulated with the other. This is the method recommended for filling prescription capsules.

The filled capsules are placed in trays having cup-shaped holes or carrying pill boxes of suitable size.

There are several methods of closing capsules, but for the retailer handling small quantities there is nothing better than a metal bolt heated in a little of the capsule mass thinned down by the addition of a little water. This bolt may conveniently be of the shape and size of a 15 or 20 ℿ. mould, and when applied to the mouth of a capsule carries sufficient heat to fuse the lips and sufficient gelatin mass to close the capsule.

Preparation of Drugs for Capsuling. Phenacetin, sulphonal, trional, guaiacol carbonate and a few others are sometimes filled as dry powders, and require no preparation further than powdering, if necessary. The empty capsule is simply stretched over a small glass or metal funnel fixed at a convenient height, the weighed quantity of powder shot into the capsule, and, if necessary, pressed down with a wooden plunger. In most cases, however, the material to be capsuled is made into a mass of semi-fluid or pasty consistence and filled by a syringe. The excipient used for this purpose must have no action on the gelatin; if water or glycerin be present, the amount must be very small. Almond or olive oil and wool fat are sometimes suitable, but liquid or soft paraffin or a mixture of both is the most satisfactory excipient in almost every case.

Ferrous chloride and aloes with arsenic and strychnine is a common prescription: the powders are triturated in a mortar

with a little liquid paraffin, some soft paraffin added to prevent separation, and the whole made up to the required volume with liquid paraffin.

Fluid extracts are generally capsuled so that a 10 ℿ. capsule represents 30 ℿ. of the normal extract. The extract is prepared without spirit, concentrated to between a fourth and a third of its volume, and made up to a third with a mixture of liquid and soft paraffins. With this admixture the extract is much more easily worked, and does not readily clog the syringe. Further, in the case of most drugs, an aqueous extract of itself contains too much water, and capsules completely filled with it would become permanently pitted.

Creosote cannot be filled into soft capsules alone on account of its miscibility with glycerin; it is usually first mixed with $1\frac{1}{2}$ or 2 volumes of almond oil.

Capsules of compound rhubarb powder are in common demand. The powder, made with heavy magnesia, is stirred into liquid paraffin till the mixture becomes stiff, then a little soft paraffin added to prevent separation, and the mass filled by a syringe. Fully 20 grs. of Gregory powder can thus be put into a 30 ℿ. capsule.

Ergotin is too watery for capsules; it should be carefully evaporated down to about three-fourths, and made up to the original volume with soft paraffin.

Capsules of Easton's syrup, of compound syrup of hypophosphites, and of the three syrups, of course, contain neither sugar nor free acid. The salts are triturated with a mixture of the two paraffins, and the volume adjusted so that 5 or 10 ℿ. represent the active constituents in a drachm of the syrup.

Syrup of iodide of iron may be represented in capsule form in the same way as Easton's syrup, but on account of the instability of ferrous iodide, it is better to prepare the salt as required in as strong solution as possible. This solution is emulsified with a mixture of wool fat and soft paraffin, and the volume adjusted so that 10 ℿ. may represent a fluid drachm of the syrup.

Ammoniated tincture of quinine, as exhibited in capsules, contains no alcohol, and the caustic ammonia is replaced by an equivalent of ammonium carbonate; the most suitable excipient is a mixture of liquid and white soft paraffin, and a convenient strength is 5 ℿ., representing a fluid drachm of the official tincture.

Carbolic acid is conveniently manipulated by incorporating it with a mixture of wool fat and soft paraffin; 1 or 2 grs. or minims of the acid may be contained in 3 or 5 ℥. of the mixture.

Scale preparations, such as iron and quinine, citrate and iron, and ammonium citrate, may be reduced to fine powder and mixed with soft paraffin; or a saturated solution of the salt may be emulsified by a mixture of wool fat and soft paraffin.

Glycerol for Otalgia. (*Formulary of Nouveaux Remèdes*, **22,** [6], 2.) Atropine sulphate, 2 to 5 *centigrammes;* morphine hydrochloride, 5 *centigrammes;* glycerin, 15 Gm. Dissolve. Introduce into the ear on a pledget of cotton wool.

Glycerophosphates, Compound Syrup of, B.P.C. E. W. Mann. (*Pharm. Journ.* [4], **21,** 788.) The unsightly deposit which occurs in this preparation is attributed to the formation of calcium citrate, formed by the interaction of citric acid and calcium glycerophosphate. It is suggested to substitute an equivalent amount of acetic acid for the citric acid prescribed in the formula.

Glycerophosphates, Glycerol of, with Red Bone Marrow: Bournemouth Formulary. (*Pharm. Journ.* [4], **22,** 385.) Calcium glycerophosphate, 80 grs.; iron glycerophosphate, 20 grs.; magnesium glycerophosphate, 40 grs.; manganese glycerophosphate, 20 grs.; potassium glycerophosphate, 40 grs.; sodium glycerophosphate, 40 grs.; citric acid, 15 grs.; chloroform, 5 ℥.; alcohol 90 per cent., 40 ℥.; orange-flower water, 1 fl. drm.; cherry-laurel water, 1½ fl. drms.; glycerin extract of red bone marrow, 10 oz.; distilled water, 10 fl. oz. Dissolve the glycerophosphates and the acid in the distilled water; then filter and add the other ingredients. *Dose*—1 to 2 fl. drms.

Guaiacol, Compound Syrup of: Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Potassium sulphoguaiacolate, 1; dissolve in warm water, 3; filter and add, syrup of orange peel, 10; dilute alcohol, 1.

Guaiacol Ointment for Parotitis and Orchitis. (*Formulary of Nouveaux Remèdes*, **21,** 16.) Guaiacol, 1; vaseline, 10; lanoline, 10. Apply to the affected part and cover with a sheet of gutta-percha.

Gum Acacia, Action of, on Morphine in Opium. R. Firbas. (*Pharm. Post.*, **38,** 735.) Investigating the action of the ferment of gum acacia on morphine (*Year-Book*, **1904,** 282), it is found that in all cases the base is ultimately oxidized into oxymorphine. But the action of the powdered gum on opium powder or extract, even when moist, does not affect the morphine content in 6 weeks. It is suggested that experiments should be made, in this direction, with liquid preparations of opium.

Hæmoglobin Solution : Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Hæmoglobin, in scales, 250 ; distilled water, cold, 400 ; dissolve and add, glycerin, 250 ; dilute alcohol, 100 ; tincture of vanilla, 1. A substitute for hæmatogen.

Hæmostatic Pills : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Dried extract of hydrastis, 1 ; extract cotton root bark, 1 ; extract of ergot, 1 ; dried extract of licorice, 1 ; powdered licorice root, 1. Mass. Divide each 15 Gm. of mass into 100 pills.

Hebra's Dusting Powder : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) French chalk, 15 ; orris root, 15 ; zinc oxide, 15 ; wheat starch, 155 ; all in fine powders. Mix.

Heroin Linctus : Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 447.) Heroin hydrochloride, 2 grs. ; tincture of hyoscyamus, 4 fl. drms. ; spirit of chloroform, 4 fl. drms. ; syrup of balsam of Tolu, 1 fl. oz. ; syrup of Virginian prune, 1 fl. oz. ; glycerin, to make 6 fl. oz. Mix. Each fluid drachm contains one twenty-fourth gr. of heroin hydrochloride. *Dose*—½ to 2 fl. drms.

Heroin Linctus with Terpene Hydrate : Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 447.) Heroin, 1 grain ; terpene hydrate, 16 grs. ; alcohol 90 per cent., 1½ fl. oz. ; syrup of Virginian prune, 6 fl. drms. ; glycerin, 6 fl. drms. Dissolve the heroin and terpene hydrate in the alcohol ; add the glycerin and syrup. Each fl. drm. contains $\frac{1}{24}$ gr. of heroin and ⅔ gr. of terpene hydrate. *Dose*—½ to 2 fl. drms.

Hop Extract : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Coarsely disintegrated hops, 2 ; are macerated for 4 days at

15°–20°C. with a mixture of alcohol 90 per cent., 4, and water, 6; after straining and pressing, the marc is again macerated for 3 hours in a similar manner with a mixture of alcohol 90 per cent., 2, and water, 3. After straining and pressing, the liquids are bulked and evaporated on the water-bath to a thick extract.

Hydrogen Peroxide, Correction of the Acidity of. J. Bougault. (*Journ. Pharm. Chim.* [6], **22,** 221.) The free acid, which is almost invariably present in commercial hydrogen peroxide, may be easily saturated by means of an equivalent quantity of borax. The HCl, H_2SO_4, H_3PO_4 or HF which may be present are thus replaced by their equivalent of H_3BO_3. Hydrogen peroxide so treated may be used instead of sodium perborate, which has the disadvantage of marked alkalinity. [Hydrogen peroxide intended for use in the treatment of otorrhœa or similar affections should always be so treated, since the acid added as preservative to the commercial solutions may easily occasion marked irritation. Boric acid, itself a powerful antiseptic, is free from this objection. Ed. *Year-Book.*]

Hyoscyamus, Infused Oil of. W. Kuntz. (*Apoth. Zeit.*, **20,** 857.) Hyoscyamus leaves, in coarse powder, 1, are moistened with 3 parts alcohol containing 2 per cent. of solution of ammonia, and allowed to macerate, in a covered vessel, for 24 hours with frequent agitation. Olive oil, 6, is then added, and the mixture digested on the water bath for 10 or 12 hours, with frequent agitation, until the ammonia and alcohol are completely driven off; the oil is then drained and pressed. The pressed residue is treated again with another 4 parts of oil, which, after digestion and expression, is bulked with the first portion. It is claimed that this method gives a product containing 0·068 per cent. of total alkaloids. [The figures given are the author's: probably the above amount of alkaloids, presuming the leaves to be thoroughly exhausted, should read 0·0068 per cent. See *Year-Book*, **1890,** 349. Ed. *Year-Book.*]

Hypodermic Intramuscular Injections of Soluble Mercurial Salts. — Danlos and — Midy. (*Journ. Pharm. Chim.* [6], **22,** 564.) Subcutine (*Year-Book*, **1904,** 247) is recommended as an anæsthetic to lessen the pain produced by hypodermic injec-

tion of soluble mercurial salts, with which it is perfectly compatible. The following prescription is given as a type : Mercuric iodide, 1 Cgm. ; sodium iodide, 1 Cgm. ; subcutine, 5 Mgms. ; sodium chloride, 2 Mgms. ; sterilized ozonized water, 1 c.c. Some hundreds of intramuscular injections have been practised with this ; in some there was absolute freedom from pain ; in most instances, a numbness for 20 to 30 minutes, or longer, followed. Sometimes small tufts of crystals form in the solution, but these may be redissolved by gently warming. Occasionally the solution decomposes spontaneously, forming only drops. This is due to impure subcutine ; if the pure base having the m.p. 195°C. be employed, it will not occur.

Hypophosphites, Compound Syrup of : Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Manganese hypophosphite, 2·25 ; iron hypophosphite, 2·25 ; potassium citrate, 5 ; citric acid, 2 ; dissolve in water, 60 ; add calcium hypophosphite, 35 ; potassium hypophosphite, 17·5 ; sodium hypophosphite, 17·5 ; quinine hydrochloride, 1·12 ; dissolved in distilled water, 300. To the mixture, add white sugar, 775 ; tincture of nux vomica, 15 ; and water sufficient to make the final weight, 1,300.

Hypophosphites, Glycerol of : Bournemouth Formulary. (*Pharm. Journ.* [4], **22,** 385.) Calcium hypophosphite, 160 grs. ; manganese hypophosphite, 80 grs. ; potassium hypophosphite, 160 grs. ; quinine hypophosphite, 80 grs. ; strychnine hypophosphite, 2½ grs. ; strong solution of ferric hypophosphite (B.P.C.), 4 fl. oz. ; hypophosphorous acid, 2 fl. oz. ; distilled water, 3 fl. oz. ; glycerin, sufficient to produce 20 fl. oz. Dissolve the hypophosphites in the distilled water and add the other ingredients. Each fluid drachm of the product should contain $\frac{1}{64}$ gr. strychnine hypophosphite, ½ gr. quinine hypophosphite. *Dose*—1 fl. drm.

Hypophosphites to obviate Incompatibility in Acid Quinine Mixture with Potassium Iodide. J. Tait. (*Pharm. Journ.* [4], **21,** 863.) It was found that by adding 2 per cent. of hypophosphorous acid, sp. gr. 1·136, or 0·7 per cent. of sodium hypophosphite, the formation of a brown precipitate was obviated in the following prescription : Quinine sulphate, 18 grs. ; dilute sulphuric acid, 3 drms. ; potassium iodide, 2 drms. ; water to 6 fl. oz.

Ichthyol "Balsam": Hamburg Formulary. (*Apoth. Zeit.*, **21**, 467.) Alcohol 90 per cent., 12; glycerin, 15; castor oil, 30; ichthyol, 43. Mix.

Incompatibility of Boric Acid with Sodium Salicylate. P. Planés. (*Annales de Pharm.*, **12**, 6.) Having to dispense a nasal snuff consisting of a mixture of boric acid and sodium salicylate with cocaine hydrochloride, the mixture, at first pulverulent, shortly became converted into a plastic mass. After keeping for a few days, this paste became hard, and could be powdered. The reaction is due to the liberation of 3 mols. H_2O by the interaction of the boric acid and the sodium salicylate.

Incompatibility of Compound Tincture of Cardamoms. A. McCutcheon. (*Pharm. Journ.* [4], **22**, 218.) *With Alkaloidal Salts.* The turbidity on first mixing, followed by a plentiful precipitate which occurs when compound tincture of cardamoms is dispensed with, solution of strychnine nitrate, or other alkaloidal preparation, is due to the tannin contained in the cinnamon bark of the former preparation. A tincture made without cinnamon bark was perfectly compatible. Of the commercial tinctures examined, some gave precipitate, others did not, when mixed with alkaloidal solutions. It is therefore concluded that in some of these essential oil of cinnamon had been employed instead of cinnamon bark. A compound tincture of cardamoms of good appearance, and quite compatible with alkaloids, was made as follows: Oil of caraway, 20 ℥.; oil of cinnamon, 12 ℥.; oil of cardamoms, 20 ℥.; cochineal, in powder, 220 grs.; glycerin, 4 fl. oz.; alcohol, 60 per cent. 80 fl. oz.

With Bismuth Mixtures. Although so frequently prescribed in bismuth mixtures, compound tincture of cardamoms is incompatible, the colouring matter forming insoluble lakes with the bismuth precipitates, such as subcarbonate and subnitrate.

With Sodium Bromide. In a mixture containing sodium bromide with compound tincture of chloroform and water, complete decoloration took place in 24 hours; whereas when ammonium carbonate was added, the loss of colour took place less rapidly, but was ultimately complete. When mixed alone the bromides of potassium and of ammonium do not much affect the colour of cochineal, but on adding ammonium carbonate they ultimately become decolorized.

Incompatibility of Lysol with Zinc Sulphate. (*Annales de Pharm.*, **12,** 7.) Lysol, or any other soapy solution of cresol, is incompatible with zinc sulphate. This cannot be avoided, but an evenly suspended precipitate may be obtained by the use of a little mucilage of acacia before adding the zinc salt.

Incompatibility of Salol with Thymol. C. Formenti. (*Boll. Chim. Farm.* through *Annales de Pharm.*, **11,** 97.) Salol and thymol, when mixed, become liquid.

Incompatibility of Sodium Salicylate and Caffeine Citrate in Solution. W. Duncan. (*Pharm. Journ.* [4], **21,** 346.) When caffeine citrate and sodium salicylate are prescribed together in solution, a precipitate of salicylic acid is formed. A clear solution may be obtained by substituting the equivalent amount of alkaloidal caffeine for the citrate.

Injections of Caffeine and Sodium Benzoate, Cause of Coloration of. J. Cambe. (*Repertoire* [3], **18,** 198.) The greenish tint sometimes produced in injection of caffeine and sodium benzoate is caused by traces of resinoid or tannoid impurities in the alkaloid. It is only formed when the sodium benzoate is alkaline; it is not apparent, even then, when synthetic caffeine, or the natural alkaloid purified by repeated recrystallizations, is used.

Injection of Quinine Hydrochloride, Prepared by a Cold Sterilization Method. P. Bruère. (*Journ. Pharm. Chim.* [6], **23,** 277.) Perfectly sterile physiological salt solution may be extemporaneously prepared by means of precipitating the official ferric chloride solution with an equivalent of solution of sodium bicarbonate, and filtering into a sterile flask. The gelatinous ferric hydrate removes, in precipitating, all micro-organisms, and leaves the supernatant liquid perfectly germ-free. This method enables the pharmacist to at once obtain a sterile menstruum for the preparation of hypodermic injections with any water. Its value and importance for those situated abroad, especially in hot climates and in military services, is obvious. The two solutions are thus prepared: (A) Dried sodium bicarbonate, 15 Gm.; distilled water to make 500 c.c. (B) Solution of ferric perchloride (*Codex*), sp. gr. 1·26, 25 Gm., or 20 c.c.; distilled water to make 500 c.c. When mixed in equal volumes, these

solutions give a sterile, clear liquid, containing 7·5 to 8 Gm. of NaCl in 1,000 c.c.

A funnel, a test-glass and a stirrer are sterilized by burning with alcohol. The solutions A and B are mixed in the test-glass in equal volumes, so as to obtain rather more liquid than is required for the injection. Stir to aid reaction, and, when complete, throw on a filter on the sterilized funnel. Rinse out the vessel destined to contain the injection with a little of the first portion of the filtrate; reject this washing; introduce the prescribed quantity of quinine hydrochloride into the rinsed vessel, and filter on to it the requisite quantity of liquid. Generally a slight effervescence takes place, which may be disregarded. By using compressed tablets, accurately dosed, of the sodium bicarbonate and of quinine hydrochloride, the official ferric chloride solution, and suitable measuring vessels, a convenient outfit for field or colonial service may be arranged.

Iodine Tincture with Chloroform. — Chassevant. (*Journ. Pharm. Chim.* [6], **23,** 117.) It is proposed to substitute chloroform for alcohol in the preparation of medicinal solutions and tincture of iodine, since it is found that these violet solutions are free from the irritating action of the spirituous preparations, and that they are much more stable. When a 10 per cent. solution of iodine in chloroform is applied to the skin, it neither occasions pruritus nor is followed by desquamation. Internally, such a solution may be prescribed in doses of 2 to 4 drops to be taken with the meals.

Iron Mixture, Compound. W. A. Knight. (*Chem. and Drugg.*, **68,** 26.) The following formula, substituting tincture of myrrh and syrup for the gum resin and sugar of the official preparation, is suggested as an improvement. Ferrous sulphate, 25 grs.; potassium carbonate, 30 grs.; essential oil of nutmeg, 5 ℥.; tincture of myrrh, 5½ drms.; syrup, 80 ℥.; mucilage of acacia, 1 drm.; rose water to 10 fl. oz. Dissolve the carbonate in 2 oz. rose water in a 10-oz. bottle, add the mucilage, and shake to cover the inside of the bottle entirely; then add the mixed oil and tincture in small portions, shaking very gently after each addition (violent shaking tends to throw out the resin in aggregated nodules); add rose water up to 7 oz., and with this mix the solution of iron sulphate previously prepared with the rest of the rose water, and the syrup. The ferrous

sulphate is best dissolved by suspending it in a small muslin bag, immersed in the rose water in a measure, so that the crystals are beneath the surface. The denser solution thus formed sinks, and the salt is rapidly dissolved without undue exposure to air.

Klein's Digestive or Pile Powder: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Rhubarb, sweet orange peel, potassium tartrate, equal parts, all in fine powder. Mix.

Kola, Compound Syrup of, Hell's. (*Journ. Pharm. Chim.* [6], **23,** 464.) Strychnine nitrate, 75 *milligrammes*; fluid extract of kola, 25 Gm.; glycerophosphate of sodium, 25 Gm. Dissolve with a gentle heat, and add syrup of bitter orange peel, 200 Gm.

Kola Granules: Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Fluid extract of kola, 10; tincture of vanilla, 1; powdered (coarsely granulated) sugar, 40. Mix intimately and partially dry with a gentle heat, granulate through a sieve, and dry completely.

Label Paste. (*Amer. Drugg.*, **48,** 287.) Tragacanth powdered, 2; boiling water, 16. Add the water to the tragacanth, stirring vigorously the while.

In another vessel mix the following: Cold water, 4; rye flour, 6; dextrin, 1. Add the paste thus made to the tragacanth paste and mix to a homogeneous mass. To the mixed paste is then added, with constant stirring, 24 parts of boiling water, and later 1 part of glycerin and 1 part of salicylic acid, the whole being lastly boiled 3 to 4 minutes under constant stirring.

Lanolimentum leniens: Ph. Austr. VIII. (*Pharm. Zeit.*, **51,** 121.) Wool fat, 50; yellow vaseline, 50; rose water, 25; orange flower water, 25; perfume, q.s.

Liniment of Potassium Iodide with Soap. J. Haddock. (*Chem. and Drugg.*, **68,** 26.) The use of coconut oil is recommended for this preparation. Coconut oil, 16; caustic potash, 5; water, 20; glycerin, 16 (by weight); potassium iodide, 4; water, 4. The finished product should weigh 40.

Dissolve the potash in a capacious tared dish, in water 20, on a sand bath. Melt the coconut oil and strain it into the KOH solution ; heat until saponification is complete ; add the glycerin, and evaporate until almost reduced to the required weight. Dissolve the KI in water 4, add to the soap, and evaporate to 40. Strain and cool. This gives a pale, amber-coloured, translucent product ; if required cream-like, it may be worked up on a slab or in a mortar, when wanted.

Liquid Extract of Thyme, Compound : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 466.) Wild thyme (*Thymus serpyllum*), dried, in coarse powder, 50 ; garden thyme (*Thymus vulgaris*), in coarse powder, 50 ; moisten with a mixture of glycerin 10, alcohol 15, and water 25. Set aside for an hour, then pack in percolator and percolate with a mixture of alcohol 17 and water 33 ; when the liquid begins to drop, close the lower orifice of the percolator and macerate for 24 hours. Continue percolation until 80 parts of percolate has been obtained, reserve this, and continue percolation until another 400 parts of percolate results. Treat a second mixed portion of 50 parts of each of the two herbs with 50 parts of the first menstruum ; treat as before, using the second percolate of 400 parts to extract it ; as before, reserve the first 80 parts, and percolate the remainder to 400 with more menstruum ; repeat the process with fresh portions of thyme until the volume of the mixed first percolates equals 800. Reserve the final portion of the second percolate for a future batch. In this manner 800 parts of fluid extract will be obtained from 1,000 parts of herbs.

[See also Elixir of Thyme with Bromides, p. 126].

Liquid Extract of Viburnum, Compound. S. C. Davis. (*Drugg. Circular*, **50,** 204.) Liquid extract of *Viburnum opulus*, 8 ; liquid extract of *Scutellaria lateriifolia*, 2 ; liquid extract of *Dioscoria villosa*, 2 ; liquid extract of cassia, 4 ; liquid extract of cloves, 1 ; alcohol 90 per cent., 24 ; glycerin, 12 ; water, 12. Mix the first three liquid extracts with the water, glycerin and alcohol, 16 ; mix the other liquid extracts with the rest of the alcohol, and pour into the first mixture, in small portions at a time, with thorough agitation. Filter, after standing for several days.

Liquor Chlorali bromatus : Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Extract of hyoscyamus, 10 Cgm. ; tincture of

Indian hemp, 80 Cgm.; tincture of ginger, 2 Gm.; peppermint water, 3 Gm.; chloral hydrate, 10 Gm.; potassium bromide, 10 Gm.; orange flower water, 15 Gm.; tincture of orange peel, 10 Gm.; extract of licorice, 1 Gm.; simple syrup, 40 Gm.; water, sufficient to make 100 Gm. Set aside for 8 days, then filter, and add chloroform, 5 drops. A substitute for Bromidia.

Liquor Cresolis Compositus. C. H. La Wall and E. F. Cook. (*Amer. Journ. Pharm.*, **78,** 169.) The following modified formula gives a cresol solution, which mixes well with water in all proportions. Heat linseed oil 350 in a deep, capacious vessel on the water bath, to about 70°C. Dissolve potassium hydroxide 80 in water 450, warm the solution to about 70°C., and mix thoroughly with the oil. Then thoroughly incorporate alcohol (methylated) 40, and continue to heat, without stirring, until a small portion of the mixture is soluble in water, without separation of oily drops. Dissolve this soap in cresol 500, and add enough water to make to final weight 1,000.

Liquor Quininæ ferro-hydrochlor. Kersch. (*Pharm. Centralh.*, **46,** 757.) Solution of iron chloroxide 4 per cent., 21; quinine hydrochloride, 5·6; dilute hydrochloric acid, 4; brandy, 15; distilled water, to make 100.

Maisin for Coating Pills and for the Manufacture of Medicinal Capsules. L. Vaudin, E. Donard and H. Labbé. (*Bull. Comm.*, **33,** 465.) Since maisin, the peculiar albuminoid of maize, is insoluble in water and in dilute acids, and is only slowly acted on by the gastric secretion, whereas it is readily dissolved by faintly alkaline liquids, and is quickly disintegrated by trypsin and the pancreatic secretion, it has been suggested for use for coating pills and for making capsules of substances intended for intestinal medication. Maisin is soluble in alcohol 2 : 5, in glacial acetic acid 1 : 1, and is readily dissolved in amylic alcohol and many other volatile organic solvents, but is insoluble in benzol. It may therefore be readily obtained in solutions of any degree of viscosity. It forms, when applied to the surface of pills, an extremely thin, supple pellicle, impermeable to water and dilute acid, but readily removed by faintly alkaline solutions. Its strong solutions can be moulded into hollow capsules with greater ease than those of gelatin. The dry product is quite unaffected by moisture or temperature.

Pills coated therewith, therefore, remain quite permanent, so that unless the active ingredients are intended to act on the stomach, it is an ideal coating if merely as a protective covering. Maisin is prepared treating by dry, ground maize with benzol, to deprive it of its fat, then digesting it in hot anhydrous amyl alcohol for 8 hours. After filtration, the amylic solution is treated with 3 volumes of benzol, which precipitates the maisin in a flocculent form. This is collected, washed with benzol, and dried in the air; the final trace of benzol being driven off by heating to 100°C. Thus obtained, maisin is a very fine, light, white powder, to which the formula $C_{184}H_{300}N_{46}O_{51}S$ has been given. By prolonged boiling with water, it is very slightly hydrolized, but is otherwise unaffected.

Malt Extract with Quinine: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Citrate of iron and quinine, 3·3; water, 33. Dissolve and incorporate with q.s. malt extract to make 1,000.

Malt Syrup, Pectoral: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 491.) Malt extract, 1; simple syrup, 4. Mix.

Malt Syrup with Fennel, Pectoral: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 491.) Fennel oil, 1; clarified honey, 500; malt syrup, 500. Mix.

Medicinal and Chemical Substances, Preservation of. F. A. Upsher Smith. (*Pharm. Journ.* [4], **22,** 31, 63, 84.) The question of the wider use of non-actinic amber glass bottles, and other precautions to be taken in the storing of drugs and chemicals, is discussed at length. The instructions of the recently published edition of the U.S.P (**1900**) in this matter are given in detail.

Menthol Snuff; Mentholin: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Menthol, 1; roasted coffee, 1; boric acid, 6; rice starch, 12; all in fine powder. Mix.

Menthol Water: Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 447.) Menthol, 8 grs.; alcohol 90 per cent., 2 fl. drms.; distilled water, 20 fl. oz. Dissolve the menthol in the alcohol, add the solution to the water, shake well, and filter after 24 hours.

Mercurial Plaster, Soft : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 476.) Mercury 40 is killed by rubbing with turpentine 20, and incorporated with a nearly cold mixture of castor oil, 15 ; turpentine, 15 ; lead plaster, 110.

Mercuric Chloride, Formation of, in Calomel Tablets. R. Vive and T. Budde. (*Apoth. Zeit.*, **20,** 408.) Reviewing the experiments of Utz (*Year-Book*, **1902,** 220), the authors have found that when known quantities of mercuric chloride were added to calomel tablets, and these are then extracted with water, only the barest trace of the mercuric salt was to be detected in the aqueous solution. This is attributed to the presence of a minute quantity of albuminous matter, which is present in the starch, invariably employed in compounding these tables. This forms a compound with the mercuric chloride, which is insoluble in water. They also reject alcohol, the solvent employed by Utz, since it is known that on boiling this with calomel $HgCl_2$ is formed. They employ instead a 0·5 per cent. solution of NaCl, in which the mercuric albuminoid compound is soluble. Operating with this solvent, the amount of $HgCl_2$ found in the oldest tablets was very small, not exceeding 0·00005 Gm. in each, and therefore negligible from a therapeutic point of view.

Mercuric Oxide Ointment, Non-irritant, for Ophthalmic Use. E. Dufau. (*Journ. Pharm. Chim.* [6], **23,** 100.) It is found that the pain occasioned by the introduction of red mercuric oxide is due to the simultaneous formation of mercuric chloride and free caustic soda, by the action of the NaCl in the lachrymal secretion on the HgO. This discomfort is overcome by using an ointment composed as follows : Orange mercuric oxide, 1 (*Year-Book*, **1903,** 294) ; vaseline, 9 ; wool fat, 10. The oxide is first triturated with a little of the melted vaseline, then mixed with the rest of the basis. The ointment thus prepared is conveniently soft for use, is miscible with the tears, adheres well to the cornea, and although without reducing action on the mercuric oxide, neutralizes any free alkali formed. It keeps well.

Miller's Dentifrice : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Thymol, 2 ; peppermint oil, 6 ; benzoic acid, 24 ; tincture of eucalyptus, 120 ; alcohol 90 per cent., 848.

Moist Extracts in India. R. Reavley. (*Pharm. Journ.* [4], **21,** 755.) The ordinary moist extracts of alkaloidal drugs are found to gain notably in strength under the normal conditions of storage of the Indian pharmacy. The advantage of the use of the dry powdered extracts, as suggested by Farr and Wright (*Year-Book*, **1904,** 464) is obvious for tropical climates.

Mustard Oil, Fixed, for Pharmaceutical Use. P. Fahlberg. (*Pharm. Post.*, through *Journ. Pharm. Chim.* [6], **22,** 18.) The use in pharmacy of the purified expressed oil of *Sinapis alba* and *S. nigra* is advocated on account of its low solidifying point −17°C. It may usefully replace olive oil for the preparation of liniments, and is valuable for use in ointments and liquid soaps. In cosmetic preparations, mustard oil might be substituted for oil of sweet almonds.

Myrrh, Tincture of. F. H. Alcock. (*Pharm. Journ.* [4], **22,** 406.) In view of the varying amount of resin soluble in alcohol 90 per cent. found in commercial myrrh, it is suggested that a definite standard for this constituent, should be officially given.

Neumeister's Collyrium : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 467.) Zinc sulphate, 2 ; fennel water, 250 ; rose water, 250 ; water, 498.

Nipple Balsam for Sore Nipples : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 467.) Peruvian balsam, 15 ; almond oil, 30 ; powdered gum acacia, 30 ; rose water, 125.

Ointment for Scabies, Hebra's : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) Flowers of sulphur, 3 ; beechwood tar, 3 ; prepared chalk, 2 ; soft soap, 6 ; lard, 6.

Ointment of Red Mercuric Oxide, Permanent. O. Raubenheimer. (*Proc. Amer. Pharm. Assoc.*, **1905,** 431.) Red mercuric oxide, in finest powder, 10 ; castor oil, 5 ; yellow vaseline, 85. Triturate the oxide with the oil until perfectly smooth, then incorporate the vaseline. Store in a covered jar, and cover with about an inch of water over the top of the ointment. It is not necessary to change the water. The ointment shows no change in a year.

Ointment of Moist White Precipitate. H. Morstatt. (*Apoth. Zeit.*, **21,** 483.) A smooth, stronger ointment is prepared as a "stock" article thus: White precipitate, freshly prepared and thoroughly pressed, 4; water, 2; wool fat, 2; vaseline, 2. One part of this rubbed down with 3 parts of paraffin ointment gives a preparation of good consistence.

Ointments for Hæmorrhoids. (*Form. Bull gén. de Thérap.*, **150,** 271.) (1) Extract of opium, 1; tannin, 8; cold cream, 60. (2) Cacao butter, 50; milk of almonds, 35; extract of hamamelis, 1. (3) Tannin, 15; cocaine hydrochloride, 12; morphine sulphate, 3; atropine sulphate, 2·5; vaseline, 300.

Omorol Injection for Gonorrhœa. (*Pharm. Centralh.*, **47,** 504.) Omorol 1 is rubbed down in a mortar with a little distilled water, then more is added until the final volume is 100. This suspension should be kept in amber-coloured bottles, and directed to be shaken.

Omorol Ointment. (*Pharm. Centralh.*, **47,** 504.) Omorol, 2 to 4; white vaseline, lanoline of each, 10.

Paraffin Ointment and Carbolic Ointment. W. Swan. (*Chem. and Drugg.*, **68,** 259.) The formula for paraffin ointment may be improved as follows: Wool fat, 1; hard paraffin, 1; soft paraffin, 3. Melt together in a shallow dish, and triturate constantly as the liquid cools, to obtain a uniform plastic mass. To prepare carbolic ointment, it is merely necessary to place the acid in a warm mortar and triturate with the above paraffin ointment until the mixture is cold.

Paraffin Ointment, Manipulation of. P. Boa. (*Pharm. Journ.* [4], **22,** 343.) In order to obtain the ointment of the required plastic consistence, free from lumps, it should be passed through a No. 40 sieve when cold.

Parogens or Vasoliments. (*Pharm. Journ.* [4], **22,** 6.) The increasing use for purposes of inunction of preparations with a combined soap hydrocarbon basis (the so-called "oxygenated paraffin") has suggested the adaptation from Continental pharmacy of the following formulæ for such preparations. The products obtained, to which the names parogen and vasoliment are applied, resemble the preparations known in commerce under

the trade-protected name "Vasogen," but they may not, of course, be supplied when vasogens are ordered. The ammoniated alcohol employed in certain instances is prepared by dissolving ammonia gas in 90 per cent. alcohol. All solids should be weighed and liquids measured.

Parogen; Liquid Parogen. Synonyms.—Vasoliment; oxygenated paraffin. Liquid paraffin, 40; oleic acid, 40; ammoniated alcohol 5 per cent., 20. Mix, and agitate until a clear solution is obtained.

Camphorated Chloroform Parogen or Vasoliment. Camphor, 37·5; chloroform, 25; parogen, 37·5. Dissolve the camphor in the chloroform, and add the parogen.

Creosote Parogen or Vasoliment. Creosote, 5; parogen, 95. Mix.

Empyreumatic Parogen or Vasoliment. Oil of cade, 25; parogen, 75. Mix.

Eucalyptol Parogen or Vasoliment. Eucalyptol, 20; parogen, 80. Mix.

Guaiacol Parogen or Vasoliment. Guaiacol, 20; parogen, 80. Mix.

Ichthammonium Parogen or Vasoliment. Ichthammonium, 10; parogen, 90. Dissolve the ichthammonium in the parogen and filter after standing awhile.

Mercury Parogen or vasoliment. Mercury, 40; wool fat, 20; thick parogen, 60. Triturate the mercury with the wool fat until metallic globules cease to be visible, and add the thick parogen.

Iodine Parogen or Vasoliment. Iodine, 10; oleic acid, 40; liquid paraffin, 40; ammoniated alcohol 10 per cent., 10. Powder the iodine, and triturate with the oleic acid till dissolved; then add the liquid paraffin and the ammoniated alcohol.

Diluted Iodine Parogen or Vasoliment. Iodised vasoliment, 60; parogen, 40. Mix.

Iodoform Parogen or Vasoliment. Iodoform, 1·5; parogen, 98·5. Dissolve the iodoform in the parogen by warming cautiously.

Deodorized Iodoform Parogen or Vasoliment. Iodoform, 1·5; eucalyptol, 1·5; parogen, 97. Dissolve the iodoform in the parogen by warming cautiously, and add the eucalyptol.

Menthol Parogen or Vasoliment. Menthol, 2; parogen, 98. Mix.

Naphthol Parogen or Vasoliment. Naphthol, 10; parogen, sufficient to produce, 100. Triturate the naphthol with the parogen until dissolved.

Tar Parogen or Vasoliment. Tar, 25; parogen, 75. Mix.

Salicylate Parogen or Vasoliment. Salicylic acid, 10; parogen, sufficient to produce, 100. Powder the salicylic acid and triturate with the parogen until dissolved.

Sulphur Parogen or Vasoliment. Sublimed sulphur, 3; linseed oil, 37; parogen, sufficient to produce, 100. Dissolve the sulphur in the oil by the aid of heat, and add the parogen.

Compound Sulphur Parogen or Vasoliment. Sulphur parogen, 10; oil of cade, 10; thymol, 0·3; eucalyptol, 3; oil of turpentine, 30; parogen, sufficient to produce, 100. Mix.

Turpentine Parogen or Vasoliment. Venice turpentine (factitious), 20; parogen, 80. Mix.

Thick Parogen or Vasoliment. Hard paraffin, 12; liquid paraffin, 48; oleic acid, 30; ammoniated alcohol 10 per cent., 10. Melt the hard paraffin on a water bath, add the liquid paraffin, the oleic acid, and ammoniated alcohol, and continue the heat until the resulting product weighs 90.

[See also *Year-Book*, **1901**, 212.]

Peppermint Water made by Trituration Method with Magnesium Carbonate unsuitable as Vehicle of Strychnine Mixtures. S. Rutherford Hill. (*Pharm. Journ.* [4], **22**, 224.) A mixture of solution of strychnine hydrochloride, 1 drm.; peppermint water, to 3 fl. oz., was found to deposit a large amount of the strychnine as crystals, on standing. This was found to be due to the peppermint water having been made by triturating the oil with magnesium carbonate and water, as is frequently done. It was shown by experiment that such peppermint water prepared in this manner is sufficiently alkaline to liberate the base from the official solution; but the solution of the B.P. **1885**, containing an undue excess of free HCl, did not give a precipitate of strychnine with the same water. For dispensing, distilled peppermint water alone should be used. If the extemporaneous trituration method must be used, calcium phosphate may be substituted for magnesium carbonate. Under no circumstances should magnesia-triturated waters be used.

Pepsin Solution : Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 448.) Soluble scale pepsin, 320 grs. ; dilute hydrochloric acid, 3 fl. drms. ; alcohol 90 per cent., 1 fl. oz. ; glycerin, 3 fl. oz. ; chloroform water, 10 fl. oz. ; distilled water, sufficient to produce, 20 fl. oz. Mix. Each fluid drachm contains 2 grs. of pepsin. *Dose*—½ to 1 fl. drm.

Percolation with Hot Alcohol. H. M. Gordin. (*Proc. Amer. Pharm. Assoc.*, **1905,** 387.) By rolling a coil of rubber tubing round the exterior of an ordinary cylindrical percolator, and allowing a stream of hot water to flow through it, a hot jacket is formed which allows a certain quantity of a drug to be readily extracted with hot alcohol. The percolator should be kept well covered to prevent undue evaporation. [An upright tube condenser for small quantities of alcohol, or an efficient reflux condenser for larger volumes, may be easily adapted to such an apparatus. Ed. *Year-Book.*]

Permanent White Cosmetic Cream. — Géymayel. (*Journ. Pharm. Chim.* [6], **22,** 48.) White vaseline, 100 ; hard paraffin, 12 ; borax, in fine powder, 4 ; simple tincture of benzoin, 4. Melt the paraffins on the water-bath ; stir in the borax and the tincture. Stir well for 10 minutes, strain through fine muslin, and allow to cool without stirring. Meanwhile rub down zinc oxide 5 with glycerin 5, by weight, add this to the cooled basis, and beat in a mortar to a uniform cream, which may be perfumed as desired.

Phenolphthalein Lozenge : Bournemouth Formulary. (*Pharm. Journ.* [4], **22,** 385.) Phenolphthalein, 2 grs. ; chocolate basis, a sufficient quantity. Make a lozenge. *Dose*—1 to 4 lozenges.

Phosphated Iodotannic Wine. L. Grimbert. (*Journ. Pharm. Chim.* [6], **23,** 15.) Dissolve tannin, 2, and iodine, 2, in alcohol 95 per cent., 20 ; dissolve monocalcic phosphate, 20, in Malaga wine, 860, and add simple syrup, 100. Mix the two solutions ; set aside, then filter.

Potassium Citrate to Obviate Incompatibility of Ferric Chloride. W. Duncan. (*Pharm. Journ.* [4], **21,** 861.) The addition of potassium citrate prevents the liberation of free iodine when ferric chloride is prescribed with alkali iodides, as in the following

case: Potassium iodide, 2 drms.; tincture of ferric chloride, 2 fl. drms.; potassium citrate, 3 drms. Water to 6 fl. oz. The iodide is added to the potassium citrate solution and the tincture, previously mixed. A yellowish-green solution results, in which no free iodine is found even after keeping for months. It appears this result is due to the formation of potassium ferri-citrate and KCl thus—

$Fe_2Cl_6 + 2\,K_3C_6H_5O_7 + 2H_2O = 2\,K_2FeO.C_6H_5O_7 + 2KCl + 4\,HCl$.

The HCl liberated reacts with the excess of $K_3C_6H_5O_7$, forming KCl and $H_3C_6H_5O_7$.

Powder for Rickets: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Calcium carbonate, 32; calcium phosphate, 15; iron lactate, 3; milk, sugar, 50. Mix.

Protosal Liniment for Inunction. A. Langgaard. (*Therap. Monats.*, **19,** 637.) Under this name, glycerin-formalin salicylate has been introduced as a means of administering salicylic acid by absorption. A teaspoonful of the following liniment is rubbed into the upper part of the thigh, or the arm pit, 3 times a day. Protosal, 50; alcohol 90 per cent., 5; olive oil to make 100.

Pulvis Duodenalis. P. H. Marsden. (*Pharm. Journ.* [4], **22,** 166.) This is prepared by scraping cleansed duodenum of the pig and drying on glass the mucous membrane so removed, at a temperature of 70 to 80°F., as in one method of preparing pepsin. The product is then powdered, and to every 3 parts of powder 1 part of calcium phosphate is added.

Pumpkin Seed Preparations as Anthelmintics. (*Pharm. Zeit.*, **51,** 405.) (1) Pumpkin seed kernels, 50; sugar, 10; glycerin, 10; orange flower water, q.s. to mass. (2) Pumpkin seed kernels, 20 to 45; sugar, 25. Rub to a paste and emulsify with milk 60. These are taken in the morning (fasting), and 2 hours afterwards a dose of castor oil is administered. Other formulæ are: (3) Pumpkin seed kernels, 40; sugar, 30; rose water, 5. (4) Pumpkin seed kernels, 50; water, 200; syrup of orange peel, 50. Rub the kernels to an emulsion with the water, then add the syrup. To be taken in 4 doses during the day, the last followed by a dose of castor oil.

Pyrogallol Ointment, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) Salicylic acid, 2; resorcin, 5; ichthyol, 5; yellow vaseline, 88.

Reclus's Antiseptic and Analgesic Ointment. (*Med. Press*, **130,** 673.) Antipyrine, 60; boric acid, 30; salol, 30; iodoform, 15; phenol, 15; mercuric chloride, 2; vaseline, 3,360. This ointment is useful as a general antiseptic wherever the skin is broken. For large surfaces, such as extensive burns, a larger quantity of vaseline than that indicated above may be used, the amount of the active ingredients remaining the same. Where the odour of iodoform is objected to, iodol may be used instead. It is specially useful for the extensive wounds of crushed limbs. The surface is first washed with water at 130°F., sprayed with hydrogen peroxide, then covered thoroughly with the ointment spread on antiseptic gauze, and the whole wrapped in absorbent wool.

Resorcin Ointment, Compound: Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 449 and **22,** 385.) Resorcin, 80 grs.; distilled water, 80 ℳ.; oil of white birch, 80 ℳ.; oxide of zinc, 80 grs.; vaseline, 320 grs.; anhydrous lanoline, 320 grs. Dissolve the resorcin in the water and mix with the other ingredients.

Resorcin Ointment, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) Salicylic acid, 2; resorcin, 5; ichthyol, 5; yellow vaseline, 88.

Rosemary Ointment, Green, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) Rosemary leaves, cut small, 8; marjoram, cut small, 3; rue herb, cut small, 3; pyrethrum root, cut, 6; alcohol 90 per cent., 16; macerate for 24 hours, then add to lard, 96; prepared tallow, 48; and heat on the water-bath until all the alcohol has evaporated. Strain, press, and to the hot fats, add yellow beeswax, previously melted, 12; to the cold ointment add oil of laurel leaves, 1; rosemary oil, 6; turpentine oil, 6.

Salicylated Soap: Luxemburg Formulary. (*Pharm. Zeit.*, **51,** 426.) Coconut oil, 240; solution of caustic potash (sp. gr., 1·130), 280; alcohol, 20; mix, and allow to stand for 24 hours, then heat for 3 or 4 hours on the water-bath.

Then add glycerin, 200; simple syrup, 200; powdered stearin soap, 50; salicylic acid, 100; distilled water sufficient to make 1,000 parts by weight.

Salicylic Acid Mouth Wash: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 465.) Powdered cochineal, 3; powdered cream of tartar, 3; are macerated for 24 hours with alcohol 90 per cent., 1,000, and filtered; salicylic acid, 5; peppermint oil, 5, are dissolved in this filtrate.

Salol Mouth Wash: Hamburg Formulary: (*Apoth. Zeit.*, **21,** 465.) Cochineal, in fine powder, 3; cream of tartar, 3, are macerated for 24 hours in alcohol, 90 per cent., 1,000, then filtered. Salol, 10; peppermint oil, 1·2; otto of rose, 1·6, are dissolved in the filtrate.

Schuett's Anti-Rheumatic Liniment: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Camphor, 15; chloroform, 15; soap liniment, 70.

Silver Iodide Emulsion. M. I. Wilbert. (*Amer. Journ. Pharm.*, **78,** 64.) Nascent, or freshly precipitated silver iodide is an efficient antiseptic for injection in urethritis in the form of an emulsion. The following is the formula employed in the Philadelphia German Hospital: Silver nitrate, 2·2; potassium iodide, 2·2; distilled water, 50; mucilage of Irish moss to make 100 fluid parts. For a heavy, coarse precipitate, the two salts are dissolved separately, each in 5 parts of the water and mixed. The remainder of the water and the mucilage are then added. For a light flocculent precipitate, which is more active, the salts are dissolved each in 50 parts of water, mixed and allowed to settle, and 50 parts of the clear supernatant liquid is decanted, which is then replaced by sufficient mucilage of Irish moss to make the volume 100. The preparation should be recently prepared and protected from daylight.

Silver Nitrate Ointment, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) Zinc oxide, 100; Peruvian balsam, 100; lard, 800; silver nitrate, in fine powder, 33.

Slippery Elm Bark, Glycerol of. P. E. Hornblower. (*Canad. Pharm. Journ.*, **39,** 267.) Slippery elm bark, 10; water, 75;

boil for 5 minutes, strain ; add water to make volume 75 ; then add glycerin, 25, and filter. As a preservative add 1 gr. of benzoic acid to each fluid ounce. This preparation is an admirable suspending vehicle for bismuth and other precipitates, and also for resinoid bodies. Apart from its use in dispensing, it forms an excellent emollient and healing application for the skin, or for wounds.

Snuff for Hay Fever. (*Apoth. Zeit.*, **20,** 750.) Quinine sulphate, 5 ; gum benzoin, in fine powder, 6. Rub to finest powder.

Solution of Iron and Manganese Peptonate. H. A. B. Dunning. (*Proc. Amer. Pharm. Assoc.*, **1905,** 397.) Egg albumin, fresh, 90 Gm. ; hydrochloric acid, 10 c.c. ; pepsin, 0·5 Gm. ; manganese citrate, 10 Gm. ; sodium citrate, 25 Gm. ; ferric chloride, 7·5 Gm. (or solution of iron oxychloride, 120 c.c.) ; solution of sodium hydroxide, 10 per cent., q.s. ; alcohol 90 per cent., 100 c.c. ; syrup, 50 c.c. ; essential oil of orange, 0·15 c.c. ; acetic ether, 0·2 c.c. ; vanillin, 0·04 Gm. ; water, q.s. to make 1,000 c.c. Dissolve the albumin in 1,000 c.c. of water, add the HCl and the pepsin, previously dissolved in 30 c.c. of water. Digest at 40°C. until no cloudiness is produced on adding HNO_3 to a small portion of the liquid. Dissolve the ferric chloride in 1,000 c.c. of water, and add it to the peptone solution ; then add the NaOH solution until precipitation is complete, avoiding excess of alkali. Wash the precipitate by decantation until free from Cl and any organic odour. Finally draw off the clear water, so that the precipitate and residual liquid measures not more than 800 c.c. Dissolve the manganese citrate and sodium citrate together in a little water, and add to the iron precipitate ; then boil until solution is effected ; cool, add the vanillin and oils dissolved in the alcohol, finally the syrup, and make up the volume to 1,000 c.c. with water. The solution thus prepared is permanent and bright.

Sprays, Medicated : Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 448.) *Cocaine Spray Compound.* Cocaine, 2 grs. ; menthol, 4 grs. ; eucalyptus oil, 6 ♏. ; camphor, 4 grs. ; spray oil, 1 fl. oz. Dissolve.

Iodine Spray Compound. Iodine, 1 gr. ; carbolic acid, 4 grs. ; spray oil, 1 fl. oz. Dissolve.

Suprarenalin Spray with Cocaine. Suprarenalin or adrenalin solution, 1 in 1,000, 90 ℥. ; cocaine hydrochloride, 9 grs. ; distilled water, 1 fl. oz. Mix. Contains : Suprarenalin or adrenalin, 1 in 5,000 ; cocaine hydrochloride, 2 per cent.

Spray Oil. Purified white petroleum oil, 4 fl. oz. ; balsam of Peru, 40 grs. Digest in a bottle on a water-bath for 10 minutes ; filter when cold.

Squill, Oxymel of. A. C. Abraham. (*Pharm. Journ.* [4], **21,** 865.) The official directions for this preparation are adversely criticized. It is considered that the alteration of the composition of a preparation so widely used should have been accompanied by an alteration of the name. The commercial article, to a large extent, does not appear to be made in conformity with the official directions. The official directions should be altered, the squill being dried and reduced to No. 20 powder, the honey used should be a definite weight, and the vinegar of squill evaporated on the water-bath, say to one half, before mixing with the honey.

Squill, Oxymel of. J. W. Clegg. (*Pharm. Journ.* [4], **22,** 106.) The following is suggested as a more definite formula than the official one : Squill, in coarse powder, 2½ oz. ; strong acetic acid, 2½ fl. oz. ; distilled water, 8 fl. oz. ; clarified honey, q.s. Digest the squill for 7 days in a mixture of the acid and water. Press strongly and filter. Mix the product with two and a half times its volume of clarified honey. Heat to boiling point, and filter if necessary.

Squill, Oxymel of. A. C. Abraham. (*Pharm. Journ.*, **22,** 213.) The fallacy of the official directions, of adjusting the final specific gravity by the addition of more or less honey, is again exposed. The necessity for employing the squill in the dry powdered condition is insisted on.

Stramonium, Powdered Standardized Alcoholic Extract of. E. H. Farr and R. Wright. (*Pharm. Journ.* [4], **22,** 310.) Experimental work, on the lines of previous communications (*Year-Books*, **1904,** 464 ; **1905,** 232), is described. Although stramonium seeds and leaves are shown to be equal in alkaloidal value, the latter only are recommended for use in galenical

pharmacy. The method of preparing a standardized alcoholic extract, in powder, is given.

Styptic Wool. Ph. Ned. IV. (*Pharm. Centralh.*, **47,** 401.) Absorbent cotton, 98, is moistened evenly with a solution of quinine hydrochloride, 4, in water, 396; half the solution, namely 200, is pressed out, and the wool containing the remainder dried at 40° to 50°C.

Suppositories for Hæmorrhoids. (*Form. Bull. gén de Thérap.*, **150,** 272.) (1) Cacao butter, 60 grs.; morphine hydrochloride, $\frac{1}{3}$ gr.; iodoform, 1 gr.; extract of rhatany, 8 grs.: for one suppository. (2) Chrysarobin, 1 gr.; iodoform, 3 grs.; extract of belladonna, $\frac{1}{10}$ gr.; cacao butter, 30 grs.

Suprarenaline and Cocaine Ointment: Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 449.) Suprarenaline, $\frac{1}{2}$ gr.; boric acid, 1 gr.; cocaine hydrochloride, 5 grs.; distilled water, 15 ℥.; hydrous lanolin, 250 grs.; vaseline, 250 grs. Dissolve the first three ingredients in the water, and mix with the lanoline and vaseline. Contains: Suprarenaline, 1 in 1,000; cocaine hydrochloride, 1 in 100.

Suprarenaline Suppositories: Bournemouth Formulary. (*Pharm. Journ.* [4], **21,** 449.) Suprarenaline, $\frac{1}{2}$ gr.; boric acid, 1 gr.; distilled water, 15 ℥.; anhydrous lanoline, 50 grs.; cacao butter, 400 grs. Dissolve the suprarenaline and boric acid in the water. Mix with the lanoline. Add the melted cacoa butter, pour into 15-grain moulds when cooling. Each suppository contains suprarenaline $\frac{1}{60}$ gr., equal to about 16 m. of the 1 in 1,000 solution.

Syrup of Cochineal, Compound; Whooping Cough Syrup: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Potassium carbonate, 4; cochineal in coarse powder, 6; hot water, 400; macerate for 30 minutes, strain, dissolve sugar, 350, in the strained liquid, and make up weight to 1,000 with glycerin.

Syrup of Horse-chestnut, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Fluid extract of horse-chestnut leaves, 1; fennel water, 1; glycerin, 1; clarified honey, 2; simple syrup, 5.

Syrup of Potassium Sulphoguaiacolate : Hamburg Formulary, (*Apoth. Zeit.*, **21,** 466.) Potassium sulphoguaiacolate, 7 ; dissolve in hot water, 23 ; and mix with alcohol 90 per cent., 3·5 ; fluid extract of orange peel, 3·5 ; simple syrup, 63. Filter.

Syrup of Thyme, Compound : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 466.) Potassium bromide, 2 ; sodium bromide, 2 ; ammonium bromide, 1 ; dissolve in water, 15 ; and mix with compound fluid extract of thyme, 30 ; (p. 141), simple syrup, 150.

Syrup of Wild Cherry Bark. J. W. England. (*Amer. Journ. Pharm.*, **78,** 267.) The formula for this syrup in the U.S.P. (**1900**) is considered to be inferior to that of the edition of **1890**. The latter may be still further improved as follows : Wild cherry bark, 5 oz. ; sugar, 24 oz. ; glycerin, 4 fl. oz. ; water, q.s. to make 32 fl. oz. Mix the glycerin with 10 fl. oz. of the water, moisten the bark with a sufficiency of the liquid, and macerate, in a covered vessel ; then pack firmly in a percolator, pour on the rest of the menstruum, and percolate to 15 fl. oz. Dissolve the sugar in this by agitation, without heat, strain and pass enough water through the strainer to make the final product measure 32 fl. oz.

Syrup, Simple : B.P. F. H. Alcock. (*Pharm. Journ.* [4], **21,** 756.) A trace of free acid is sometimes present in syrup, which will then crystallize, although of the correct strength. This may be prevented by the addition of 1 gr. of K_2CO_3 to each 12 oz. by weight of syrup.

Tamarind Pastilles, Compound : Ph. Austr. VIII. (*Pharm. Zeit.*) Purified tamarind pulp, 10 ; powdered senna, 3 ; powdered sugar, 5 ; starch powder, 1. Mix on the water bath to a suitable consistence. Divide into 40 gr. pastilles, and coat with chocolate.

Thyme, Liquid Extract of : Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Moisten thyme herb, 100, with a mixture of glycerin, 10 ; alcohol 90 per cent., 15 ; water, 25 ; and set aside in a closed vessel for 3 hours. Then pack in a percolator, and add percolate with a menstruum of alcohol 90 per cent., 1, water, 3, until 50 parts of percolate have been obtained.

Any further percolate may be set aside for the preparation of the next batch of the fluid extract.

Thyme, Saccharated Liquid Extract of : Vienna Formulary. (*Pharm. Zeit.*, **51,** 373.) Fluid extract of thyme, 10 ; glycerin, 1 ; simple syrup, 89. This is a substitute for "Pertussin."

Thymol Mouth Wash : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 466.) Cochineal, in fine powder, 3 ; cream of tartar, 3, are macerated for 24 hours in alcohol 90 per cent., 1,000 ; then filtered. Thymol, 10 ; peppermint oil, 5, are dissolved in the filtrate.

Tinctura Opii Vinosa : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 513.) Opium, in coarse powder, 1 ; sherry, 6. Macerate for 8 days ; strain, press and filter.

Tinctura Rusci, Hebra's : Hamburg Formulary. (*Apoth. Zeit.*, **21,** 513.) Oil of birch tar, 35 ; ether, 6 ; alcohol 90 per cent., 6 ; lavender oil, rue oil, rosemary oil, of each, 1. Mix.

Tolu Balsam, Syrup of. A. Astruc and J. Cambe. (*Journ. Pharm. Chim.* [6], **22,** 418.) Granular balsam of Tolu, 10 per cent., is first prepared as follows : Balsam of Tolu, 5, is dissolved in alcohol 90 per cent., 10, and poured on clean sand, 45 Gm., in a mortar. After thorough trituration, the granulated product is exposed to the air, with occasional stirring to prevent agglomeration, until dry. The granulated product is then preserved in well closed bottles. To prepare the syrup, 5 parts of the above product is packed in a long conical glass percolator, the lower extremity of which is plugged with a pad of cotton wool, and boiling water is passed through the mass, in small quantities at a time, until the percolate measures 10. When cold, this is filtered, and white sugar, 18, is dissolved in the percolate, in a closed vessel, by means of a gentle heat. The process is expeditious, and the product has an exceptionally fine aroma.

Vanilla Extract. O. Kalsh. (*Amer. Drugg.*, **48,** 199.) Mexican vanilla beans, 7, are cut in small pieces and split longwise ; they are then placed in an earthenware jar, and boiling water, 2, is poured over them, and macerated for 24 hours. The liquid is then poured off, and the beans finely

divided, preferably in a sausage machine. The ground vanilla is then mixed with granulated sugar, 14, in an earthenware jar, the liquid of the first maceration is added together with another 16 parts of water. The mixture is frequently stirred during 24 hours; then alcohol 90 per cent., 16, is added, the whole being macerated for 7 days: a further addition of alcohol, 16, is then made; after another week, a further 8 of alcohol is added. Maceration is continued for another 30 days; the liquid is then strained off, and the marc packed in a percolator and percolated with a menstruum of alcohol, 4, and water, 3, until the product, together with the strained liquid, equals 112 fluid parts. The process is lengthy, but is stated to yield an extract superior to any other.

Vaseline and Wax Ointment Basis for Ointments containing Liquids. P. van der Wielen. (*Pharm. Weekblad*, **1905,** 492.) By the addition of 5 per cent. of white or yellow beeswax to vaseline, an ointment basis is obtained, with which 75 per cent. of aqueous solution may be incorporated without subsequent separation. This basis may therefore be used with advantage for the preparation of creams, in place of lanoline.

Verdigris Ointment: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 514.) Verdigris, in powder, 2; frankincense, in powder, 2; yellow wax, 5; oleoresin of turpentine, 10; olive oil, 31.

Veronal, Hypodermic Injection of. R. Guyot. (*Répertoire*, [3], **18,** 148.) A trace of caustic soda may be used to render veronal sufficiently soluble in water to permit of its use as a hypodermic injection, thus: Veronal, 2 Gm.; solution of sodium hydrate, sp. gr. 1·032, 20 drops; water to 10 c.c. Each c.c.=0·20 Gm. of veronal. The addition of alkali does not render the solution irritant when injected, and does not affect the physiological action of the drug.

Weimar Lotion: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 467.) Spirit of camphor, 5; zinc sulphate, 10; precipitated sulphur, 20; water, 965.

Yellow Mercuric Oxide, Ointment of. G. Pinchbeck. (*Pharm. Journ.* [4], **21,** 359.) The ointment is directed to be made as follows: Precipitate the oxide, in the usual manner

protected from light, preferably in a photographic dark-room. Wash the precipitate until the washings cease to react with phenolphthalein; collect on a calico filter, drain over a filter pump, then dry at a gentle heat until not more than 20 per cent. of water remains. Determine this amount of water, and mix the moist precipitate with the ointment basis, thus: Moist yellow mercuric oxide, as above, equivalent to 0·1 or 1, as prescribed; anhydrous wool fat, 1; spermaceti ointment, or white vaseline, to make 10. (See also p. 144.)

Zinc Gelatin Paste, Hard: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 477.) Zinc oxide, 250, is rubbed smooth with water, 150, and glycerin, 100; then mixed with a hot solution of best white gelatin, 150, in water q.s. to weigh 1,000. Meanwhile, thymol, 1, is dissolved in alcohol 90 per cent., 10, and added to the other ingredients. The nearly cold mass is poured out to form sheets.

Zinc Oxide Dusting Powder: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 490.) Zinc oxide, 1; rice starch, 2; French chalk, 2. All in fine powder. Mix.

Zinc Oxide Liniment, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Carbolic acid, 20; zinc oxide, 30; glycerin, 475; water, 475.

Zinc Sulphate Injection: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Zinc sulphate, 1; tincture of opium, 2; mucilage of acacia, 20; water, 177.

Zinc Sulphate Injection, Compound: Hamburg Formulary. (*Apoth. Zeit.*, **21,** 478.) Carbolic acid, 1; zinc sulphate, 10; lead acetate, 10; tincture of opium with saffron, 20; mucilage of acacia, 200; water, 1,759.

RESEARCH LIST, 1906

The following subjects are suggested for investigation; the Executive Committee hope that members of the B.P.C. will undertake to work on one or more of these questions. New subjects have been added to the list to replace those worked out. The Hon. Secretaries wish to call attention to the special fund which exists to defray expenses connected with research work. The Executive Committee will be glad to receive applications from members for grants from this fund.

Plant Analysis.

1. *Aletris farinosa*. The bitter principle of the rhizome requires investigation. (See *Pharm. Journ.* [3], **17,** 122, 123.)

2. *Bay Berries*. An examination of the bitter principle of the pericarps of bay berries is required.

3. *Belladonna, Stramonium and Henbane*. Determination of the distribution of the alkaloid in the lamina, petiole, mid-rib, small and large stems. (See *Year-Book* **1906,** 30.)

4. *Calendula*. To what principle is the bitterness of the flowers due ?

5. *Castor Oil*. A research having for its object the isolation of a purgative principle is required. (See *Year-Book*, **1898,** 163, 184; **1901,** 125. *Pharm. Journ.* [4], **5,** 84; **11,** 152.)

6. *Chamomile*. Research upon the bitter principle of *Anthemis nobilis*. (See *Bull. de Soc. Chim.* [2], **41,** 483; *Year-Book*, **1904,** 266.)

7. *Cimicifuga racemosa* (*Actæa racemosa*). Further information is needed on the chemical nature of the constituents to which the rhizome of the plant owes its activity. (See *Year-Book*, **1885,** 149.)

8. *Damiana* is reported to contain a bitter substance, resins and volatile oil. The liquid extract of the leaves being extensively used, a systematic examination of this drug is desirable.

9. *Euphorbia pilulifera.* Required, a report upon the chemistry of this drug.

10. *Fennel.* Fruits, exhausted or partially so, of essential oil and artificially coloured are met with in commerce. If used in making compound liquorice powder, how can they be detected ?

11. *Hemidesmus indicus.* The extraction and examination of the aromatic body.

12. *Ipecacuanha.* A process for the determination of the several alkaloids in the preparations of this drug.

13. *Mezereon Bark.* What is the chemical nature of the acrid principle of this bark ?

14. *Papaver rhœas.* An examination of the red colouring matter of the petals is required.

15. *Simaruba Bark.* A comparison of the constituents of this drug with those of quassia wood is desirable.

16. *Strophanthus.* An examination of the published methods of separating the different active principles obtained from the seeds is needed with the view of recommending a standard process. (See *Year-Book*, **1898,** 54, 162 ; **1899,** 59 ; **1901,** 167 ; **1906,** 74 ; also *Pharm. Journ.* [4], **6,** 385, 506.) The seeds as met with in commerce are frequently mixed. Further information is desirable as to the active principles they severally contain.

17. *Veratrine.* Should a pure veratrine be included in the British Pharmacopœia rather than the mixture of alkaloids now official ? If so, suggest a process for its purification.

18. *Proximate Analyses* of the following drugs are required : *Cereus grandiflorus, Citrullus colocynthis, Cassia fistula, Serenoa serrulata* (Saw Palmetto), *Arnica montana, Monsonia ovata* and *Monsonia biflora.*

Chemistry.

19. *Ammonii Phosphas.* A rapid method for the assay of this salt.

20. *Acidum chromicum.* A method for the determination of chromic acid suitable for inclusion in the Pharmacopœia.

21. *Apomorphine.* Do solutions of salts of this alkaloid retain their potency after coloration has taken place ?

22. *Calx sulphurata.* Commercial samples of this should be examined to ascertain the amount of true sulphide generally present.

23. *Chloral hydrate.* An improved method is required for the determination of the strength of solutions of this substance,

24. *Ferri arsenas.* The official tests supply only the means of determining the amount of ferrous iron present. A simpler method than those published for the determination of the arsenic content is much to be desired. (See *Pharm. Journ.* [4], **7,** 530; *Year-Book,* **1903,** 572.)

25. *Glycerin.* Required a good method for determining this substance in tinctures, liquid extracts, etc.

26. *Liquor Bismuth. et Ammon. Cit.* A comparison of the different methods suggested for the manufacture of this is required.

27. *Litharge.* Examination of the litharge of commerce, more specially with a view as to its suitability for pharmaceutical purposes, is required.

28. *Solids.* A method is required for the accurate determination of solids in spirituous preparations containing glycerin.

Pharmacopedy and Pharmacy.

29. *Acacia.* An examination of commercial samples of the powdered gum is required.

30. *Aromatic Waters.* A comparison of the quality and keeping properties of aromatic waters prepared by distillation of the drug with those of waters made by solution of the oil.

31. *Bougies.* A simple machine for making bougies by pressure.

32. *Cantharides.* Comparison of the published methods for the assay of this drug.

33. *Cannabis indica.* Required, standard strengths for the official preparations of this drug, and processes for their determination. Experiments are also needed to determine the difference in yield of resin, cannabin and cannabinol between the guaza of Bombay, the ganjah of Calcutta, and other commercial varieties of cannabis.

34. *Compressed Drugs.* A report on the relative suitability of different varieties of starch for promoting disintegration of compressed tablets.

35. *Compound Liquorice Powder.* A report upon commercial samples of this is desirable. See No. 10.

36. *Ergot.* Required a method of determining the relative activity of the official preparations of Ergot.

37. *Ipecacuanha, Liquid Extract of.* Experiments to deter-

mine whether the use of lime can be dispensed with in making this are required.

38. *Jaborandi.* The leaves, as imported, are much mixed with stalks. Should the leaves be completely separated from the stalks for the making of official preparations? What is the ether-soluble alkaloidal strength of old leaves, young leaves and stalks? The tinctures of this drug met with in commerce are likely to vary considerably in alkaloidal content. A report on commercial samples would probably prove instructive.

39. *Liquor Sennæ Concentratus.* In this preparation the senna is exhausted by repercolation; in the liquor for preparing Syrupus Sennæ, B.P., a process of double maceration is employed. Which is the better method?

40. *Ointments.* An improved basis is wanted to replace Ungt. Paraffini, B.P., the physical characters of which are unsatisfactory.

41. *Oxydase.* The action of this and other ferments in inducing changes in galenical preparations such as liquid extracts, etc.

42. *Oxymel Scillæ.* What change, if any, takes place when heat is used for making this preparation?

43. *Powdered Drugs.* Experiments on the approximate quantitative determination of the constituents of mixtures of powdered vegetable drugs by means of the microscope.

44. *Quillaia Bark.* Experiments to determine the best menstruum for exhausting this bark for the purpose of making emulsifying agents.

45. *Suppositories.* A method of emulsifying aqueous liquids with theobroma oil in the preparation of suppositories.

46. *Tannin.* Comparative examination of the tannin at present in commerce (solubility in various solvents, moisture, etc.).

47. *Witch Hazel, Distilled Extract of.* The imported article varies much in character and properties. Required, an investigation upon this. (See *Pharm. Journ.* [3], **13,** 524.)

TRANSACTIONS

OF THE

British Pharmaceutical Conference

AT THE

FORTY-THIRD ANNUAL MEETING

IN

BIRMINGHAM,

1906.

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Constitution and Rules of the Conference.

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General Index to the Year-Book and Transactions.

British Pharmaceutical Conference.

CONSTITUTION.

Art. I.—This Association shall be called The British Pharmaceutical Conference, and its objects shall be the following :—

1. To hold an annual Conference of those engaged in the practice, or interested in the advancement, of Pharmacy, with the view of promoting their friendly reunion, and increasing their facilities for the cultivation of Pharmaceutical Science.
2. To determine what questions in Pharmaceutical Science require investigation, and when practicable, to allot them to individuals or committees to report thereon.
3. To maintain uncompromisingly the principle of purity in Medicine.
4. To form a bond of union amongst the various associations established for the advancement of Pharmacy, by receiving from them delegates to the annual Conference.

Art. II.—Membership in the Conference shall not be considered as conferring any guarantee of professional competency.

RULES.

1. Any person desiring to become a member of the Conference shall be nominated in writing by a member, and be balloted for at a general meeting of the members, two-thirds of the votes given being needful for his election. If the application be made during the recess, the Executive Committee may elect the candidate by a unanimous vote.
2. The minimum subscription shall be 7s. 6d. annually, which shall be due in advance upon July 1.
3. Any member whose subscription shall be more than two years in arrear, after written application, shall be liable to be removed from the list by the Executive Committee. Members may be expelled for improper conduct by a majority of three-fourths of those voting at a general meeting, provided that fourteen days' notice of such intention of expulsion has been sent by the Secretaries to each member of the Conference.
4. Every association established for the advancement of Pharmacy shall, during its recognition by the Conference, be entitled to send delegates to the annual meeting.
5. The Officers of the Conference shall be a President, a number of Vice-presidents not exceeding six, by election, the past Presidents (who shall be Vice-presidents), a Treasurer, two General Secretaries, one local Secretary, and nine other members, who shall collectively constitute the Executive Committee. Three members of the Executive Committee to retire annually by ballot, the remainder being eligible for re-election. They shall be elected at each annual meeting, by ballot of those present.
6. At each Conference it shall be determined at what place and time to hold that of the next year.
7. Two members shall be elected by the Conference to audit the Treasurer's accounts, such audited accounts to be presented annually.
8. The Executive Committee shall present a report of proceedings annually.
9. These rules shall not be altered except at an annual meeting of the members.
10. Reports on subjects entrusted to individuals or committees for investigation shall be presented to a future meeting of the Conference, whose property they shall become. All reports shall be presented to the Executive Committee at least fourteen days before the annual meeting.

*** *Authors are specially requested to send the titles of their Papers to The Hon. Gen. Secs. Brit. Pharm. Conf., 17, Bloomsbury Square, London, W.C., two or three weeks before the Annual Meeting. The subjects will then be extensively advertised, and thus full interest will be secured.*

FORM OF NOMINATION.

I Nominate

(*Name*) . . . . . .

Address) . . . . . .

as a Member of the British Pharmaceutical Conference.

. . . . . *Member*

Date . . . . . .

This or any similar form must be filled up legibly, and forwarded to *The Asst. Secretary Brit. Pharm. Conf.*, 17, Bloomsbury Square, London, W.C., who will obtain the necessary signature to the paper.

Pupils and Assistants, as well as Principals, are invited to become members.

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Smiley, John A. R., 109, Eccles Old Road, Pendleton, Manchester.
Smith, Arthur E., Owens College, Manchester.
Smith, A. W., Pershore.
Smith, F. A., 35, Colmore Row, Birmingham.
Smith, F. A. Upsher, Briarfield, Chatsworth Road, Chesterfield.
Smith, Fredk., 221, Soho Road, Handsworth, Birmingham.
Smith, J., 22, Chapel Road, West Norwood, S.E.
Smith, John, 3, Terenure Road, Dublin.
Smith, J. Collett, 36, Birkbeck Road, Acton, London, W.
Smith, J. H., 227, Commercial Road East, E.
Smith, J. L., 180, High Street, Pendleton, Manchester.

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Smith, T. Connell, 22, City Road, E.C.
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Southall, Wilfred F., 17, Bull Street, Birmingham.
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Squire, G., 19, Haymarket, Sheffield.
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Stamp, F. U., 29, High Street, Hampstead, N.W.
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Starkie, R. S., 126, Strand, W.C.
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Thomson, W., 153, Byres Road, Glasgow.
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Thresh, John C., M.D., D.Sc., D.P.H., Chelmsford, Essex.
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Toone, J. A., 50, Old Christchurch Road, Bournemouth.
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Townsend, Chas., J.P., St. Mary's, Stoke Bishop, Bristol.
Townsend, Wm., Little Queen Street, Exeter.
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Truman, H. Vernon, Market Square, Wickham, Hants.
Tupman, H. Wyke, 6, Montague Street, Worthing.
Turnbull, H. J., Tavistock Works, Sunderland.
Turner, C. W., 12, Foregate, Worcester.
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Turney, J. Davy, 15, Leigham Terrace, Plymouth.
Turver, C. H., 40, Market Street, Blackpool.
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Umney, E. A., 48 & 50, Southwark Street, S.E.

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Wakefield, Thos., Brookfields, Birmingham.
Wakeham, C., Helston, Cornwall.
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Walker, William, Downfield, by Dundee.
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Ward, J., 39, Eastgate Street, Gloucester.
Waring, A. W., 3, Bucklersbury, E.C.
Warner, C. Home, 17, Bloomsbury Square, W.C.
Warren, W., 24, Russell Street, Covent Garden, W.C.
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Watson, F. P., F.C.S., 6, Bailgate, Lincoln.
Watson, J. E. H., Rose Corner, Norwich.
Watt, Geo. A., 20, Lynn Street, West Hartlepool.
Watts, Wm., 5, James Street, Crieff.
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Webb, E. A., 60, Bartholomew Close, E.C.
Webb, E. F., Sun Street, Hitchin.
Webb, John H., Market Place, Luton.
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Wellcome, H. S., Snow Hill Buildings, Holborn Viaduct, E.C.
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White, Thos. A., Elm Grove, Southsea.
White, W. Carter, F.C.S., 58, Bunhill Row, E.C.
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Wooddisse, Frank B., Kenilworth.
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Woolley, G. S., Victoria Bridge, Manchester.
Woolley, Hermann, Victoria Bridge, Manchester.
Woolley, Percy, Victoria Bridge, Manchester.
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Worrall, J. H., F.I.C., F.C.S., Howsley, Chapeltown, nr. Sheffield.
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Wyley, W. F., Wheatley Street, Coventry.

Wyman, J. S., 58, Bunhill Row, E.C.
Wynne, E. P., 7, Pier Street, Aberystwith.

Yates, C. G., 9, Upper Hamilton Road, Brighton.
Yates, D., 32, Darwen Street, Blackburn.
Young, E. F., 67, Wells Road, Bristol.
Young, J. Rymer, F.C.S., 40, Sankey Street, Warrington.
Young, J. R., 38, Chalmers Street, Lauriston, Edinburgh.
Young, J. R., Junr., 18, Comeragh Road, W. Kensington, W.
Young, R. F., Lindum House, New Barnet.

NOTICE.

Members are requested to report any inaccuracies in these lists by letter, addressed as follows:—

THE ASST. SECRETARY,
BRIT. PHARM. CONF.,
17, *Bloomsbury Square*,
London, W.C.

PROGRAMME OF THE PROCEEDINGS

OF THE

BRITISH PHARMACEUTICAL CONFERENCE

AT THE

FORTY-THIRD ANNUAL MEETING, BIRMINGHAM, 1906.

OFFICERS.

President. W. A. H. NAYLOR, F.I.C., F.C.S., London.

Vice-Presidents.

(Who have filled the office of President.)

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S. R. ATKINS, J.P., Salisbury.
CHAS. UMNEY, F.I.C., F.C.S., London.
N. H. MARTIN, F.R.S.E., F.L.S., Newcastle-on-Tyne.
C. SYMES, Ph.D., Ph.C., F.C.S., Liverpool.
J. C. C. PAYNE, J.P., M.P.S.I., Belfast.
E. M. HOLMES, F.L.S., Ph.C., London.
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HENRY G. GREENISH, F.L.S., F.I.C., London.

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Honorary Local Secretary.
CHAS. THOMPSON.

Assistant Secretary.
JOHN HEARN.

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D. LLOYD HOWARD, London.
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Editor of the Year-Book. J. O. BRAITHWAITE.

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ATKINS, J.
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BROWN, J.
BROWN, R.
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HUBAND, G. T.
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NEWTON, A.
PARKINSON, F. W.
PECK, T. W.
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PERKIN, T.
PERKINS, T. R.
PLATTS, J.
POOLE, J.
PROSSER, F. H.
RADFORD, J. A.
REEVE, T. L.
RICHARDSON, P. G.
RICHARDS, F. J.
SCOTT, W.
SELLECK, W. R.
SHAKESPEARE, W.
SHORTHOUSE, H. S.
SOUTHALL, ALFRED.
SOUTHALL, G.
SOUTHALL, WILFRED F.
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SMITH, F. J.
SMITH, F.
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TANKARD, A.
THOMPSON, CHAS.
TRANMER, H. M.
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TWINBERROW, J.
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WAKEFIELD, JOHN.
WAKEFIELD, THOS.
WALKER, J.
WHITE, G.
WILLIAMS, C. C.
WILLDEY, W. T.
WILLCOCK, F. A.
WILTON, W. E.
WITHERS. J.
WYLEY, W. F.

THE SITTINGS OF THE CONFERENCE WERE HELD IN
THE LECTURE THEATRE, BIRMINGHAM UNIVERSITY,
ON TUESDAY AND WEDNESDAY, JULY 24 AND 25, 1906.

TUESDAY, JULY 24.

The CONFERENCE met at 10 a.m., adjourning at 1 p.m. for luncheon at the Grand Hotel; and at 2 p.m., adjourning at 4 p.m.

Order of Business.

Address of Welcome by the Lord Mayor (Councillor A. J. Reynolds).
Presidential Address by W. A. H. Naylor, Esq., F.I.C., F.C.S.
Reception of Delegates.
Report by Executive Committee.
Presentation of Financial Statement.
Reading and Discussion of Papers.

PAPERS.

1. *The Determination of Strychnine by the Nitric Acid Process*, by E. H. Farr, F.C.S., and R. Wright, F.C.S.
2. *Standardized Powdered Alcoholic Extracts: No. 5, Nux Vomica*, by E. H. Farr, F.C.S., and R. Wright, F.C.S.
3. *Some Applications of Physical Chemistry to Pharmacological Problems*, by F. Slater Price, D.Sc., Ph.D., F.I.C.
4. *Note on Strophanthus and Strophanthin*, by E. W. Mann.
5. *Notes on the Flora of the Lickey Hills*, by John Humphreys.
6. *The Detection of Tartrates and Citrates*, by J. F. Tocher, F.I.C.
7. *The Activity of Pepsin after Brief Contact with Certain Inorganic Compounds*, by J. F. Tocher, F.I.C.
8. *The Examination of Some Commercial Malt Extracts*, by E. F. Harrison, B.Sc., F.I.C., and the late D. Gair, B.Sc., A.I.C.
9. *The Emulsification of Aqueous Liquids with Oil of Theobroma in the Preparation of Suppositories*, by S. Taylor.

WEDNESDAY, JULY 25.

The CONFERENCE met at 9.45 a.m., adjourning at 1 p.m. for luncheon at the Grand Hotel; and at 2 p.m., adjourning at 3.30 p.m.

Order of Business.

PAPERS.

10. *Review of Past Analyses of Drugs Officially Bought in Birmingham* by J. F. Liverseege, F.I.C.
11. *The Determination of the Amount of Nitrogen in Some Common Drugs by the "Kjeldahl-Gunning" Process*, by F. H. Alcock, F.I.C.

12. *Note upon Unguentum Cocainæ, B.P.*, by R. A. Cripps, F.I.C.
13. *A New and Simple Method of Moulding Bougies*, by A. W. Gerrard.
14. *Some Recent Chemical Discoveries in the Eucalypts*, by Henry G. Smith.
15. *Note upon the Determination of Fibre in Drugs*, by H. W. Jones, F.R.M.S.
16. *Notes upon Some of the Liquid Extracts*, by D. B. Dott, F.R.S.E. F.I.C.
17. *Analysis of Pharmaceutical Preparations*, by J. E. Brunker.
18. *Note on Ammoniated Mercury*, by Thomas Tyrer, F.I.C., F.C.S.

GENERAL BUSINESS.

Presentation of Books from the "Bell and Hills Fund."
Selection of Place of Meeting for 1907.
Election of Officers for 1906–1907.

THURSDAY, JULY 26.

Excursion to Worcester and Malvern. For particulars see page 321.

BRITISH PHARMACEUTICAL CONFERENCE

MEETING AT BIRMINGHAM, 1906.

The undermentioned visitors signed the Attendance Book :—

Adelaide (*S.A.*)—Clayton, J. W., and Mrs.

Assam (*India*)—Moore, Wm.

Atherstone—Parkinson, F. W.

Barnet—Young, R. F.

Beckenham—Parsons, W.

Belfast—Gibson, A. ; Gibson, W. J. ; Gibson, Miss ; Nicholl, I. W.

Bilston—Shelley, J.

Birmingham—Alcock, F. H. ; Barclay, Thos., and Mrs. ; Barclay, Misses ; Barker, T. H., and Mrs. ; Barlow, F., and Mrs. ; Bennison, E. C. ; Blackbourne, A. ; Blackwell, J. ; Boucher, H., and Mrs. ; Brown, M. ; Buggins, Miss ; Burleigh, W. M. ; Canning, E. ; Canning, S. ; Canning, T. ; Cattell, J. T., and Mrs. ; Corfield, E., and Mrs. ; Cuxson, J., and Mrs. ; Cuxson, Misses ; Cuxson, P. W. ; Critchlow, H., and Mrs. ; Dallow, C. E., and Mrs. ; Edwards, W. J., and Mrs. ; Featherstone, W. B. ; Ferriday, H. J. ; Ferriday, Miss ; Freeman, M. W. ; Harries, A. H. ; Hill, Miss ; Hill, T., and Mrs. ; Hollick, R. ; Humphreys, J. ; Hurst, J. V. ; Jenson, A. ; Johnson, S. E. ; Johnson, Miss ; Jones, J. T. ; Liverseege, J. F. ; Lowther, T. W. ; McBride, W. ; Mann, E. W. ; Morlan-Jones, W. J. ; O'Hey, T. ; Otley, T. ; Perry, G. E., and Mrs. ; Platts, J. ; Poole, J., and Mrs. ; Prosser, F. H., and Mrs. ; Prosser, Miss ; Radford, J. A., and Mrs. ; Radford, Miss ; Reynolds, Councillor A. J. (Lord Mayor) ; Sawyer, Dr. Jas. ; Scott, W. C., and Mrs. ; Shakespear, Wm. ; Shaw, W. A. ; Smith, F. A., and Mrs. ; Smith, — and Mrs. ; Smith, Miss E. S. ; Southall, A. ; Southall, A. W., and Mrs. ; Southall, G., and Mrs. ; Southall, Wilfred, F. ; Thompson, C., and Mrs. ; Thompson, C., junr. ; Wakefield, J., and Mrs. ; Willdey, W. T., and Miss ; Wilson,

W. J.; Wilton, J., and Mrs.; Wilton, W. E.,; Wilton, Misses; Woodcock, B. J.

Bradford (*Yorks*)—Jackson, J., and Mrs.; Jackson, Miss; Hanson, A.; Silson, R. W.

Brechin—Hutton, J.

Brighton—Cripps, R. A.; Robinson, C. E.; Savage, W. W.

Bristol—Boorne, H. E.; Kirby, F. B.; White, J. W., and Mrs.; White, Miss Edith.

Burnley—Knapton, T.

Bury—Crompton, H.

Buxton—Wright, R.

Calcutta—Grice, W. T.; Lang, W. H.

Cambridge—Peck, E. S.

Cardiff—Hagon, A., and Miss.

Ceylon—Ephramus, R. L.

Cheltenham—Barron, W.; Thomas, J. A., and Mrs.

Coventry—Fletcher, T.; Jones, H. W., and Mrs.; Wyley, W. F.

Croydon—Ashton, F. W.; Harrison, E. F.

Doncaster—Stevenson, Dr. J., and Mrs.

Dowlais—Rees, R. P.

Dublin—Beggs, G. D.; Smith, J.; Walsh, Dr. J. A.; Watson, D., and Miss; Wells, W. F.

Dudley—Richardson, P. G., and Mrs.

Dumfries—Tocher, John, and Mrs.

East London (*Cape Colony*)—McJannet, J., and Mrs.

Edinburgh—Dott, D. B.; Hill, J. R.; Rowland, G. H. C., and Mrs.

Enfield—Goldby, F.

Exeter—Aplin, I. W.; Gadd, H. W.; Lake, J. H.

Glasgow—Gilmour, J. P.; Lothian, J.

Gloucester—Minchin, W., and Mrs.

Godalming—Mather, J. H.

Hanley—Jones, Ed.

Hitchin—Ransom, F.

Leeds—Beacock, H.; Castleton, W. T., and Mrs.; Sargeant, F. P.

Liverpool—Evans, J. H. E.; Evans, W. P.; Lescher, T. E.; Marsden, P. H.; Shacklady, J.; Symes, Dr. C.

London—Allman, J. D.; Bennett, R. R.; Bremridge, R.; Brewis, E. T.; Chalmers, W.; Finnemore, H.; Francis, A.; Goodall, F. C.; Greenish, Prof. H. G.; Hearn, J.; Hills, J. S.;

Howard, D. Ll.; Humphrey, J.; Idris, W. H. W.; Knight, G. J.; Layman, C. N.; Layman F. N., and Mrs.; Layman, Miss; Lescher, T. E.; Martindale, Dr. W. H.; Morson, T. P.; Naylor, W. A. H.; Pretty, C.; Smith, J. H., and Mrs.; Solomon, A. H.,; Tyrer, Thos. and Mrs.; Umney, J. C., and Mrs.; Want, W. P.; Weld, C. C.; White, Ed., and Mrs.

Manchester—Balmforth, A.; Franklin, J. H.; Grier, J.; Johnstone, C. A.; Kemp, H., and Mrs.; Kemp, Miss Ethel; Kirkby, W.; Little, Misses; Pidd, A. J.; Pidd, Miss M. E.; Smiley, J. A. R.; Walton, J. Woodruff; Wild, J., and Mrs.; Wyatt, W.

Malvern—Mander, A.

Newcastle-on-Tyne—Cosh, A. L. S., and Mrs.

Nuneaton—Iliffe, G.

Norwich—Watson, J. E. H., and Mrs.

Oxford—Clayton, C.; Dolbear, W. T.; Druce, G. C.

Oswestry—Vaughan, D., and Mrs.

Peebles—Lindsay, R., and Mrs.

Peterhead—Tocher, J. F.

Sheffield—Antcliffe, H.; Appleton, J. T.; Fox, A. R.; Jackson, G., and Mrs.

Shrewsbury—Cross, W. G., and Mrs.

Southport—Righton, J.

Stockton—Graham, F. A.

Stourbridge—Sellick, W. R.

Stoke-on-Trent—Bentley, T.

Sydney (*N.S.W.*)—Knapton, P.

Torquay—Quant, E., and Mrs.

Tunbridge Wells—Hobbs, A. E., and Mrs.; Howard, G. W., and Mrs.

Uppingham—Bayley, C., and Mrs.

Wednesbury—Jackson, D.

Wimbledon—Gerrard, A. W., and Mrs.; Gerrard, Miss.

Wolverhampton—Coleman, J. H., and Mrs.; Gibson, F. J., and Mrs.; Phillips, S.; Stanway, E. T.; Willcock, F. A., and Mrs.

Worcester—Coverdale, A. E., and Mrs.; Turner, C. W.; Twinberrow, J.

Yarrow-on-Tyne—Reaveley, R.

GENERAL MEETING,

Tuesday, July 24, 1906.

The Sessions of Conference began at 9.45 in the Lecture Theatre, Birmingham University. The President was supported on his right by the Lord Mayor of Birmingham, Sir James Sawyer, Mr. E. S. Peck, Mr. E. White, Mr. G. C. Druce and Mr. J. C. Umney; on his left were Mr. Thos. Barclay, Mr. F. Ransom, Mr. D. L. Howard and Mr. A. W. Gerrard.

The PRESIDENT first called upon the Lord Mayor (Councillor A. J. Reynolds).

The LORD MAYOR, on behalf of the citizens of Birmingham, offered a cordial welcome to the Conference, and expressed pleasure that, after a lapse of twenty years, the city of Birmingham had been re-visited. The organization of the B.P.C. was an important and influential one, with high aims, its objects being the encouragement of pharmaceutical research, the promotion of friendly intercourse and union amongst pharmacists, and the uncompromising maintenance of the principle of purity in medicine. These objects, fully carried out, mark the path of true progress, and ensure the confidence and co-operation of the medical profession, while laymen heartily approve of them, for although they desire to take as little medicine as possible, they certainly wish to have that little of the best possible quality. His lordship extended an invitation to any visitors who would like to inspect the Reference and Shakespeare Libraries. In conclusion, he said he hoped the visitors would carry away pleasant recollections of Birmingham, and he also expressed the hope that the meeting would be a very successful one, and that its visit would prove enjoyable.

The PRESIDENT, in reply, said in the first place he desired to ask permission to express a sentiment of gratitude on behalf of the members of the Conference and their friends for the reception given the previous evening in the Council House by the Lord Mayor and Lady Mayoress. They were charmed as they strolled through the spacious chambers and inspected the beautiful works of art they contain. The members appreciated very highly the kindness of his lordship in coming amongst them that morning and opening the proceedings with words of good cheer and goodwill, which excited their admiration, and were taken as an evidence of the sympathy with them in their work,

the interests of which they were met there that day to promote. The members of the Conference were glad to have the opportunity of revisiting Birmingham—a city distinguished in the past and famous in the present; possessing men of light and leading, men who have impressed themselves on the life of this democratic and aggressive people. Birmingham was associated in their minds with great names, great preachers, great philanthropists, great politicians, great orators and men great in counsel, learning, arts and science, including medicine. To-day they said to his lordship: Long may this great succession continue; and in the name of the assembled members of this Conference he tendered their sincere thanks for his most cordial greeting.

Mr. DRUCE seconded the vote of thanks to Councillor Reynolds for giving this hearty welcome, and for his kindness in receiving the Conference in such a magnificent manner. The Conference had met with great kindness at the hands of the municipal authorities in every city or town they visited. He thought it showed they were in touch with the powers that be, although they represented an antiquated, and to some extent a played-out, business. Their business was the preparation of medicine, and he could assure his lordship that the more physic he took the more he would want, and that those persons who now died young at ninety would live to at least 150 if they took plenty of medicine. But it must be the right medicine, made up by the right persons, and in the right places. In conclusion, he thanked his lordship very much, and seconded the vote with the greatest possible pleasure.

Mr. THOMAS BARCLAY, Chairman of the Local Committee, said there was a tinge of sadness in the retrospect of twenty years since the Conference last met in Birmingham. He greatly missed, amongst others, the genial face of the then President of the Conference, and his old colleague on the Executive of the Chemists' Trade Association, Mr. Thomas Greenish. There were many other vacant places of those who were present then—indeed, only this week one of the men who was always to the fore on such occasions, a man greatly respected by his brethren—Joseph Lucas—had passed away. His case was somewhat typical of the changes which had taken place since last they met in Birmingham. Then, Mr. Lucas was actively engaged in an honourable business, greatly respected by the medical profession, his fellow-tradesmen and the public. He earned a moderate

income, paid his way, and lived a happy and useful life. It was, however, necessary, only a few months ago, to make an appeal on his behalf to the Benevolent Fund Committee, to secure an annuity to enable him to obtain the necessities of life. He was a fine type of an Englishman—manly, honest, industrious, full of good nature, well up in his business, popular with his customers, and with all this he became a candidate for relief from the Benevolent Fund. Amongst those invited to the Conference there were not a few who had made excuses which, reading between the lines, made it clear that things were not much better with them than as depicted of Mr. Lucas. One wrote from a suburb of London apologising for his inability to be present, and said he was too much engaged in fending off the three horrors of existence—the workhouse, county gaol and lunatic asylum —ever to dream of any pleasure in this life ; and, furthermore, he was doubtful of any such luck for a present-day chemist and druggist hereafter. No doubt there was some exaggeration here, but behind it all there was much of sober truth. Mr. Lucas qualified as a chemist in 1876, and that was his condition after thirty years' toil and anxiety in a business which involves such serious responsibilities to the public and himself. Pondering over these things, he (the speaker) thought it might throw some light on the matter if he compared the *Birmingham Directory of* 1886, the year the Conference last met here, with that of 1906. The comparison was difficult, as the population of the city and neighbourhood had increased so largely in the period. The increase was from 535,000 to 780,000, or nearly 50 per cent., but, so far as chemists and druggists were concerned, there were, according to Kelly's *Directory*, in 1886, 188 chemists and druggists in business, and of these twenty-four were pharmaceutical chemists, so that if they had kept pace with the population there would have been 282 chemists and thirty-six pharmaceutical chemists at the present day. Instead of 282 there were only 148 chemists, and instead of thirty-six pharmaceutical chemists there were only sixteen, or, putting the matter in another way, there were, in 1886, 188 chemists in business, of whom twenty-four were pharmaceutical chemists, and, in 1906, 148 in business, and sixteen pharmaceutical chemists, and that without allowing anything for the increase of population. There was, however, another important factor. There were in 1886 a few chemists who had branch shops. He could not find any who had more than one, but in 1906,

although there were also a few branch shops, the circumstances were very different, for, under the direction of two limited companies, with their headquarters in distant towns, one had thirteen branches, and the other eight, whilst in another case the proprietor had six branches. The question naturally arose—was this altered condition of things to the benefit of the public? There could be but one answer by those who had given that consideration to the subject which it deserves. In that city those whose memory would carry them back a few years could recall the names of men like Arblaster, Churchill, Humphreys, Hipkins, Samuel Adkins, W. S. Atkins, Stirling Grieves, Robert Walker, Chas. Flewitt and Joseph Lucas, all of whom (with the exception of their dear old friend Arblaster, who was still living, though in feeble health and not in business) were gone, and their places were wiped out of existence. Now, each of these men had a personality, and was an asset to the city. His income was spent in their midst, he contributed to the charities, and was, because of his education and training, looked up to by his fellow-citizens, and of great value in dealing with public questions affecting the health and happiness of the community. It must be remembered, too, that although he was thus available for the public service, he was none too well paid, for of the whole of those mentioned none accumulated wealth, and several left their families impoverished. It must also be remembered that these men, who knew their business well, and who took a great personal interest in it, were students and contributors to the advancement of pharmacy. They were in personal contact with the members of the medical profession, and assisted them in their work. These were the men who had been wiped out; and what had they in their place? Branch businesses carried on by companies, each being under the management of a qualified assistant, but all directed from headquarters! There was no pride of proprietorship, or responsibility, and the pharmaceutical preparations were made at a common centre. Then as to the question of economy, so far as the public is concerned there is no doubt but that the poor apothecary, multiplied by 188, got less out of the public than the 148 now, including the large number of branch shops under management. In conclusion, the speaker urged his brethren to do everything possible to foster and develop pharmacy as a science, for it was only by so doing that the public would be compelled to recognize the importance of individual responsibility. The British Pharma-

ceutical Conference stood for that principle, and he was therefore glad, in the name of his brethren in Birmingham and the Midland district, to give, on their behalf, a hearty welcome. He also had much pleasure in supporting the vote of thanks to the Lord Mayor, who had always been ready and anxious to do everything possible to make the Conference a success.

The Lord Mayor, in reply to the vote of thanks, said he thanked them very much for the cordial manner in which they had received this resolution. It had been a great pleasure to him to do anything he could—and he was speaking for Mrs. Reynolds as well as himself—to help to make this Conference a success as far as lay in their power. He sincerely hoped that they would have a very pleasant visit to Birmingham.

Sir James Sawyer extended a hearty welcome from the medical profession of Birmingham to the members of the pharmaceutical profession. He was not, he said, the junior member of the medical profession in the city, and he would not like the Conference to open without giving it a hearty welcome. "It is our hope," he continued, "that as a result of this meeting something may come which will help us. You and I are bound, together to assuage human suffering. The medical profession has well-nigh perfected itself in the diagnosis of disease, but it has much to do which it cannot do without you, and that relates to the cure of disease. We long for the prevention of disease, but in the meantime we have to realize that the treatment of disease is lagging behind. I foresee great results from the intelligent co-operation of the medical and pharmaceutical professions, and on those grounds, more than for civic and official reasons, I welcome you most heartily."

Mr. John C. Umney, in proposing a vote of thanks to Sir James Sawyer, said he was glad to know that the assistance pharmacists were giving the medical profession was so well appreciated. It was the wish of both branches of the profession to strive by their union to reach those ends which Sir James had indicated.

Mr. F. Ransom, in seconding the motion, said pharmacists considered it an honour to be able to assist such a noble profession as that of medicine.

PRESIDENTIAL ADDRESS.

PROGRESS IN PHARMACOPEDICS: DRUGS AND THEIR CONSTITUENTS.

BY W. A. H. NAYLOR, F.I.C., F.C.S.

To-day the British Pharmaceutical Conference opens its annual sessions for the third time in the industrial metropolis of the Midlands, an event unprecedented in its history. Since its last visit Birmingham has attained the dignity of a city and university rank, and has given full proof of her determination to share the larger outlook and the fuller life that characterize the newer seats of learning. It would be received by us with a feeling of gratification and a sense of indebtedness if among the wide range of subjects taught here pharmaceutics should find a place—perhaps a more prominent place than the subjects of our profession have at present—but I am pleased to know that there is in the organization a nucleus at least which may grow into a pharmaceutical department before the Conference again visits Birmingham. Such a development would be a recognition by the Senate of the usefulness of the pharmacist to the community, and an evidence of its desire to encourage him to acquire the higher knowledge that will enable him the better to fulfil the duties that appertain to the scientific side of his calling. It may safely be prophesied that among the younger and rising generation of pharmacists, there are those who will be eager to take advantage of the opportunity a university provides, to prosecute their studies beyond the point needed to prepare for and to obtain their statutory qualifications. The demands on the knowledge and skill of the pharmacist promise to become increasingly heavy and more minutely exacting, and the ability with which he meets them will determine his general success. He is rightly charged with the responsibility of dispensing physicians' prescriptions, and presenting in their most active and approved forms preparations of drugs for administration by the medical practitioner. His obligation is increased when he is required to isolate and supply the chief constituent of a drug, to keep *au courant* with recent literature on the chemistry of drugs, and to make investigations that shall add to the common stock in his branch of knowledge. Reflecting along these lines, it occurred to me that the Conference chair provided a suitable opportunity for giving expression to certain

thoughts that have simmered in my mind for a not inconsiderable time on the subject of the valuation of drugs. The question is a large one, and for the purposes of a presidential address may be considered insufferably dry; nevertheless I ask your indulgence and sympathetic interest while I endeavour by reference to typical examples to discuss it in outline. The guiding points kept in view in pursuing this inquiry are—

(1) How far can the newer knowledge acquired as the result of the chemical or physiological investigation of drugs be usefully applied to their evaluation? (2) To indicate where there is a lack of common agreement in the isolation of principles and to focus the attention of workers on the points needing fuller elucidation.

Aloes.

Since the classic researches of Tilden, the various kinds of aloes have engaged the attention of many investigators, who have succeeded in elucidating obscure points connected with the chemistry of the drug. The following may be accepted as established facts :—

That barbaloin, of commercial purity, was first isolated by Smith & Co., and subsequently analysed by Stenhouse in 1851. That the aloins from Barbados and Curaçoa aloes respectively are identical, having a common melting point and composition $C_{16}H_{16}O_7$ (Tschirch and Hoffbauer) or $C_{16}H_{18}O_7$ (Jowett and Potter). That these two varieties of aloes contain an identical isoaloin which is isomeric with barbaloin, the isomer being present to a greater extent in Curaçoa than in Barbados.

That the resin of both varieties is an ester of aloeresinotannol and cinnamic acid. That capaloin, a product of *Aloe lucada*, is identical with the aloin yielded by Uganda aloes, as evidenced by a correspondence in their melting point and composition. That isoaloin is not a constituent of Zanzibar aloes. That Tilden's formula for zanaloin $C_{16}H_{18}O_7$ has been confirmed by Tschirch and Hoffbauer, its composition being identical with capaloin and ugaloin, from both of which it differs in its higher melting point.

That Tschirch has also confirmed Flückiger's formula for socaloin $C_{34}H_{38}O_{15} + 5H_2O$. That Socotrine aloes gives Bornträger's reaction less markedly than Barbados, Curaçoa, or Cape, and that the reaction depends upon the presence of an oxymethyl-anthraquinone group.

Points of disagreement that have arisen between investigators may be largely due to a difference in the variety of aloes operated on. Leger states that the French and English commercial aloes Barb. are apparently different. Tschirch joins issue with Leger, who states that Jafferabad aloes contain about 20 per cent. of aloins, chiefly isobarbaloin, and that Cape aloes (botanical source ?) gave him barbaloin and a new aloin differing from those known. The chief points of difference are at the present time the subject of investigation, and their settlement may confidently be anticipated in the near future. Added testimony to the extent to which aloe emodin exists *per se* in the different aloes is needed. It is generally conceded that Barbados aloes (Curaçoa) is more active than any of the other varieties, but Holmes affirms that Cape is more purgative than other kinds; whilst Tschirch and Pederson attribute to the aloe emodin the property of exercising an important influence on the medicinal action of the drug. That aloin is the chief but not the only active constituent of aloes does not appear to be open to doubt; hence, in any valuation of the drug, a determination of the aloin alone would be an insufficient measure of its medicinal value. The resin is understood to be quite inactive, so that the most rational method of assaying the drug would be to estimate the non-resinous constituents either directly or by difference. For this purpose Tschirch and Hoffbauer have devised a process which gives results that do not accord with physiological testing or common experience, and the accuracy of which has been disproved by van Itallie. This is a question to which pharmacists should address themselves.

A series of experiments with the object of determining the proportion of non-resinous constituents and aloin would be of service in helping to fix standards for this important drug.

Balsam of Tolu.

Experience of the bisulphide of carbon test of the Pharmacopœia shows it to be in many cases valuable for discriminating between genuine and spurious balsams. From the description of it in the official monograph certain details are omitted which are needed to be observed for its successful application. To the more important omissions, revealed by my own experiments and those of others, I desire to call attention. The instruction to evaporate the carbon bisulphide solution to dryness lacks precision. It should be amended so as to read after dryness: "at

a temperature not exceeding 110° F. until the weight is constant," as cinnamic acid is appreciably volatile at higher temperatures, and loss would be likely to ensue. Spilsbury and Joyce effected the drying of their residues at or below 100°F. The direction to saponify the dry bisulphide of carbon residue with potash is too indefinite, and after potassium hydroxide the wording " in the form of normal alcoholic solution, the mixture being heated for three-quarters of an hour in a water-bath," should be inserted. As to the standard fixed for ensuring the " presence of a sufficient proportion of benzoates and cinnamates," my experience indicates that as a minimum it is too high, and has the effect of excluding genuine samples of the balsam. In place of not less than one-third of its weight of potassium hydroxide of the Pharmacopœia, I should suggest not less than 290 parts of potassium hydroxide per 1,000 parts of dry residue, as against Braithwaite's original recommendation of not less than 300 parts. It has been suggested that the potash consumed should be calculated into cinnamic acid on the original balsam. The expression of the result in terms of cinnamic acid has no advantage over the present method, but a saving of time would be effected by expressing the result on the original balsam in place of the dry residue, as evaporation of the carbon bisulphide solution would not require to be carried beyond the stage necessary for the removal of the solvent. In addition, it is desirable that the proportion of free acids to esters extracted by the carbon bisulphide should be known, which can be readily ascertained by titrating the residue with alkali before saponifying. Spilsbury and Joyce are of opinion that the saponification equivalent is insufficient, and that partially exhausted balsams might still satisfy the official requirement. The qualitative tests for the balsam should include one for the detection of rosin and copaiba. If the tests as described in the Pharmacopœia are amended on the lines indicated, I am of opinion that their value would be considerably enhanced. The quantitative test of the United States Pharmacopœia has the advantage over the British Pharmacopœia one in point of simplicity and time required for its execution; but any acid or saponifiable body soluble in alcohol added to the balsam would be titrated and reckoned among its natural constituents. It has the defect in that the end reaction is not so sharp as could be desired. With the British Pharmacopœia, on the other hand, resinous bodies likely to interfere with the saponification are readily detected by the

character of the carbon bisulphide residue. It is noteworthy that the United States Pharmacopœia process has yielded me higher figures both for acid and saponifiable substances than those obtained by titrating and saponifying the carbon bisulphide residue of the British Pharmacopœia process.

Cantharides.

Until the researches of Greenish and Wilson, a really dependable process for the estimation of cantharidin free and combined in Spanish flies was a desideratum. The assay of the fly, both by Greenish and Wilson's and Dieterich's process, gives concordant results, and the average yield of total cantharidin from sound specimens may be fixed at 0·60 per cent. Experience, however, shows considerable variation in the commercial article, a statement which finds confirmation in the complaints that occasionally arise as to the failure of the official Liquor Epispasticus to answer the required purpose. That any liquid preparation of cantharides when the solvent employed is bland in its nature owes its activity to the cantharidin present is universally conceded.

It does not appear, however, to be equally well known that when the cantharides is applied in the form of a plaster, its capability for blistering purposes is increased by the degree of coarseness of the powder employed. Cases have come within my personal knowledge where the official plaster, when made with Spanish fly in fine powder, has failed to raise a blister, but has proved effective when a coarse powder has been substituted. The reiterated recommendation to replace the crude drug by an equivalent of cantharidin in the official preparations is deserving of serious consideration by clinicians, and, if found to yield satisfactory results, should be adopted. The only additional suggestion I make bold to offer is that Professor Greenish, or some other equally competent investigator, should, in the light of newer knowledge, re-investigate the subject with the direct object of devising a process simple of operation that would ensure the complete extraction of the cantharidin and its exact determination.

Cascarilla.

The chief constituents of cascarilla are a bitter crystalline substance cascarillin, an indefinite resin, essential oil, and one or more bases. The medicinally valuable substances may be

limited to the first three. Indeed, if the therapeutic uses of the drug depend on the presence of an agreeable bitter, then the important principle is the cascarillin. In consideration of the ease with which cascarillin can be obtained in a state of purity, colourless, crystalline, of constant melting point, and composition, it is a matter of surprise that little is known of its pharmacological action or therapeutic use. In the absence of dependable information of the separate constituents, definite and proximate, any assay of the drug must embrace these bodies in their entirety.

From experiments that I have made, alcohol appears to me to be too general a solvent for determining exclusively the really useful constituents. For the valuation of the drug I recommend its exhaustion with acetone in a Soxhlet, the recovery of the solvent by distillation, and the drying of the residue at 120°F. to constant weight. The marc is quite free from bitterness and oil, so that the extractive represents to the full extent the aromatic bitter for which the drug is prized. If it is desired to carry the process a step farther, and determine approximately the proportion of bitter relatively to essential oil, this can readily be done by subjecting the weighed residue constant at 120°F., to 230°F., until it ceases to lose weight. Dr. McWalter has suggested that cascarilla might be more largely used by physicians if it could be obtained of less varying quality, he having noticed considerable variations in the proportions of ash and extractive yielded by the drug. After much experimenting, I have found of recent years a considerable deficiency of the bitter principle cascarillin, the bark otherwise being of excellent quality.

Euonymus.

The chief form in which this drug is administered is that of a powdered alcoholic extract of the bark. On more than one occasion I have pointed out the greater activity of the euonymins over the Extractum Euonymi Siccum when made with stronger alcohol than 45 per cent. Of the official extract Marshall, in his *Materia Medica*, remarks: "It is generally said to increase the secretion of the bile, but it probably acts only as a cholagogue purgative." He further states: "The pharmacopœial doses are insufficient to cause purgation." My personal experience of the extract is in general agreement with these statements, and justifies me in modifying them only to the extent that in the dose usually given it rarely acts as a purgative, but

as a tonic. The published experiments of Naylor and Chaplin, Squire and others all show that if by an effective preparation is implied one that will act as a powerful hepatic, then an alcohol not weaker than 70 vols. should be used in the making of it. The extract of euonymus of the recent Pharmacopœia of the United States is a good example of what the preparation ought to be (of combined pharmaceutical propriety and therapeutic effect), and I hope one equally active will in due course replace the unnecessarily weak extract of the present Pharmacopœia.

Gelsemium.

The literature of gelsemium root having reference to its examination chemically dates back to 1855, when Kollock isolated an impure substance, which he designated gelseminia. In 1869 Eberle examined the root and reported that the woody portion contained no alkaloid. The following year Wormley isolated a new and fluorescent principle possessing acid properties, which he named gelseminic acid. Concurrently he found that gelseminia produced all the symptoms usually observed in cases of poisoning by the drug, a statement subsequently confirmed by Bartholow, and supplemented by the interesting observation that pharmacologically it resembled conium more nearly than any other drug with which he was acquainted. In 1882 Wormley disproved the statement by Robbins that gelseminic or gelsemic acid was identical with æsculin, and the correctness of his observation was confirmed a few years later by Coblentz and by Schmidt, who found it to be identical with β-methyl æsculetin. Gerrard, who examined the root in 1883, for the first time succeeded in obtaining a base that crystallized, from which he prepared characteristic crystalline salts. To the base, which he named gelsemine, he assigned the formula $C_{12}H_{11}NO_2$. Four years later Thompson isolated two bases from the root, one being crystalline and the other amorphous, thus confirming Ringer and Murrell's hypothesis as to the existence of two alkaloids. The amorphous base was pronounced by Cushny to exert a much more powerful physiological action than the crystallizable base. Ten years after Gerrard's investigations Spiegel prepared crystalline salts of the amorphous base, and gave to gelseminine the formula

$$C_{22}H_{26}N_2O_3, \text{ or } C_{24}H_{28}N_2O_4,$$

which is Gerrard's formula doubled. In 1896 Göldner repeated

Spiegel's work, and confirmed it. Despite the confirmation of Spiegel's results, his formula does not appear to have found acceptance by the author of a recently issued and most excellent text-book of materia medica. Our present knowledge of gelsemium, considered chemically and physiologically, and confirmed by different investigators, may be stated to be :—That the root contains two alkaloids : gelsemine, which is crystalline, and gelseminine, which is amorphous, and that the latter is physiologically more active than the former. The point that awaits determination is the relation of the two bases to each other.

In consideration of the fact that gelsemium is a powerful drug, and that its activity is due " almost solely " to its alkaloidal principles, it is a matter of surprise that the United States Pharmacopœia has not directed the liquid extract to be standardized, the more so as it is commercially obtainable of a definite alkaloidal strength.

Ginger.

The chemistry of this drug does not appear to have received that measure of attention which, from its general use as a domestic remedy, it deserves. It is not easy to assign a reason for this comparative neglect. It may be due to the generally accepted opinion that the mixture of substances known as gingerin, or oleo-resin of ginger, represents all that it contains of medicinal value, and that the therapeutic requirement having been adequately met, the stimulus needed for further chemical investigation does not exist. On the other hand, the fact that the active principle occurs only in small quantity, and that its isolation in a state of purity is a matter of great difficulty owing to the tenacity with which it retains resin, and the ease with which it is decomposed, may have deterred investigators from extending their inquiries in this field of research. Again, the drug contains many other constituents, the isolation and purification of which required much time and care. The name of Dr. Thresh, a former officer of this Conference, stands out prominently in the literature of ginger by reason of the elaborate and extended nature of his investigations. The results of the earlier portion of his work were communicated to our annual meeting in 1879 at Sheffield, and were followed by other valuable papers on the same subject.

According to his researches, an ethereal extract of the rhizome

of Jamaica ginger, which is practically gingerin, contains volatile oil, fatty and resinous bodies, and a pungent principle (gingerol), which occurs as a viscid, yellow, and odourless liquid. Amongst other constituents detected in the drug, was an alkaloid occurring in minute traces which he did not isolate and about which nothing is known. He also determined, but calls his results "mere approximations," the percentage of gingerol in the rhizome, and subsequently examined more minutely the resins and gingerol that he had isolated. He did not succeed in obtaining gingerol in a crystalline form, but assigned to it the formula xC_5H_8O. The volatile oil, on further examination, was found to be "an exceedingly complex mixture of hydrocarbons and their oxidation products." The chief constituent was a hydrocarbon $C_{15}H_{24}$.

Later investigators have found camphene, zingiberene ($C_{15}H_{24}$) and phellandrene, although the presence of the last-named has been questioned by some. The average percentages of the resin yielded by the three kinds of ginger are Jamaica 4·8 per cent., Cochin 4·6 per cent., and African 6·6 per cent. The recommendation by Idris of acetone for the extraction of the pungent and aromatic principles of ginger has met with much favour.

The frequency with which ginger is adulterated with "spent ginger" has led to many attempts to devise some simple and reliable means of detecting such adulteration. Dyer and Gilbard recommend the determination of the alcoholic extract obtained after previous exhaustion with ether, but the experiments of A. H. Allen (the late) and C. J. Moor and of Bennet give the preference to the determination of the soluble ash and cold water extract. Further information on the chemistry of gingerol is very desirable.

For a more complete and much-needed valuation of ginger for pharmaceutical purposes I submit that what is required is a process sufficiently accurate and easy of execution by the pharmacist for the separation of the volatile oil and gingerol free from the fatty and resinous substances that accompany them in the oleo-resin, and its application to the determination of the pungent and aromatic principles of ginger. That is to say, a process for assaying the drug on the basis of its gingerol and volatile oil. I have good reason to believe that an examination of commercial gingerins (oleo-resin) would yield interesting results.

Guaiacum Resin.

That the chief constituents of the resin of guaiacum are guaiaretic acid, guaiaconic acid, and guaiacic acid is not a matter of dispute. Of these three acids the second is invariably present in the largest proportion, and is acknowledged to be a constituent to which is mainly due the blue colour produced by the action of oxidizing agents on the resin. The limitation of the description in the official monograph to its physical characters, and a colour reaction is unnecessarily severe, and the paragraph should be extended so as to prescribe tests for assuring the quality of the resin and its freedom from common adulterants. The official requirements should include the proportion soluble in 90 per cent. alcohol and the percentage of ash, as proposed by J. C. Umney, and the insertion of definite limits for the acid number. (Dieterich) A specific test for rosin, which is a cheap and not uncommon adulterant, should be given. The one described in the U.S.P. is easily applied, and comparative experiments have satisfied me that it is capable of detecting any proportion of rosin added for the purpose of profitable adulteration. In the description of the U.S.P. test, instead of "should not give a green colour on the addition of an equal volume of solution (1 in 1,000) of cupric acetate," the direction should read, "When shaken with an equal volume of an aqueous solution of cupric acetate (1 in 1,000) the supernatant liquid should not be coloured green." Experience of the method prescribed in the same volume for the determination of the acid number shows it to be unsatisfactory, inasmuch as the end reaction is indefinite, and a small error in reading off the volume of alkali required is the cause of a large error in the result. P. Richter has recently shown that guaiaconic acid consists of α and β acids, and that when treated severally with oxidizing agents the α variety alone yields the characteristic blue colour (*Archiv. d. Pharm.*, **244**, 90).

Hops.

Although the chemistry of hops has received a large share of attention, there still remains much uncertainty as to its definite principles. The processes employed by the earlier investigators for the isolation of the bitter constituent would undoubtedly effect to a large extent its decomposition, and consequently the results obtained have now little more than an historic value. Among the supposed educts extracted by different workers at

various times may be mentioned :—Lupulotannic acid, lupulic acid, α and β-hop bitter acids, lupulinic acid, boric acid, myricin, asparagin, trimethylamine, choline, an alkaloid, an enzyme, resins, fatty matter, etc. Some of these have been shown to be identical, and it may be anticipated that extended investigation will still further curtail the list. Lermer appears to have been the first to isolate, though in an impure state, an acid that was bitter and crystalline, and closely approximated to one of the accepted bitter principles of the drug. This, when purified, is identical with the lupulic acid which Bungener (H) obtained from lupulin. Barth and Lintner recognize two bitter acids, α and β ; the latter (lupulinic acid) they pronounced identical with Bungener's lupulic acid. The two acids are closely allied and have nearly equal equivalent weights. Lintner and Schnell designate the β acid lupulinic acid, and the α acid humulone, and the evidence tends to show that these are the bitter principles of hops. The diverse properties attributed by various investi gators to the alkaloid of hops suggest the possibility that different substances have been in the hands of the respective authors. Hantke has isolated an alkaloid from the seeds, and has promised further work on the subject, so we may hope that the question will be satisfactorily settled. There is little doubt that the active principles of the hops reside in lupulin. Russell found that an extract prepared from the bracts free from lupulin was inactive. If this is so, then hops might with advantage be deleted from the Pharmacopœia, and lupulin alone retained. Rutherford Hill states that a tincture made from lupulin lacks the peculiar tannin of hops. Future investigation may decide whether this constituent is of medicinal value. Regarding the valuation of hops and their preparations for pharmaceutical purposes, further development will almost certainly take place in the direction of an estimation of the bitter principles. Lintner has devised a process in which these bodies are assayed by standard potash solution. In Remy's process provision is made for the approximate quantitative separation of the bitter acids. It is upon lines similar to these that methods for the determination by chemical means of the medical value of the drug will in all probability be based.

Lobelia.

This drug has been the subject of considerable research, but the results obtained have been too variable to place beyond a

doubt to what principles or principle it owes whatever medicinal value it possesses. Whether it contains the one base only, lobeline, and, if so, whether it is liquid or solid, or whether two bases are present, one liquid and the other crystalline, or one amorphous and the other crystalline, is a question that apparently still awaits a satisfactory settlement, an expression of opinion that implies no reflection on the quality of the work published by those who have chemically examined it. The balance of probability, and, indeed, the generally accepted view, is in favour of Siebert's liquid base, lobeline, as being the principle on which its activity depends. Until, however, the results of further research provide the data on which can be founded a common agreement, it would be prudent to refrain from standardizing the official tincture by a process based on its alkaloidal strength.

Male Fern.

The literature of male fern suggests that it is a veritable hunting ground for the scientific investigator. All who have turned their attention to it have had a find that must have gone far to sweeten their labour. Among the principles discovered and isolated in the rhizome of the *Aspidiums* examined or their ethereal extracts are :—Filicic acid, crystalline and amorphous, volatile oil, aspidin, albaspidin, flavaspidic acid, filicinyl butanone, aspidinin, aspidinol, and filmaron.

Clinical observation has repeatedly made clear that the ethereal extract of male fern is liable to contain a toxic body in addition to a marked vermifugal principle or principles. Walko is of opinion that the untoward effects following the administration of the extract are due, not as generally supposed to filicic acid, but more probably to aspidin and aspidinin. Hausmann states that aspidin is not a constituent of *A. Filix Mas.* As to the principle or principles to which its anthelmintic properties are to be attributed, there appears to be no definite fixity of opinion. Poulsson and Kraft agree that crystalline filicic acid is comparatively inert, and that amorphous filicic acid is the active constituent. Kobert lays stress upon the volatile oil as an important constituent, while Kraft is equally decisive that pharmacologically it does not count. Boehm at first fixed upon aspidin and filicic acid as the principles of anthelmintic value, but after further researches concluded that aspidinol, flavaspidic acid, albaspidin, and filicinyl butanone also exert a tænicide

action more or less pronounced. Finally Kraft isolated an amorphous acid which he designated filmaron, and as a non-toxic and satisfactory vermifuge it claims to hold the field. Clinical observations made by Jaquet go to show that filmaron is innocuous and effective for the expulsion of worms. Of the many principles isolated from male fern, the only one commercially obtainable on demand, so far as my knowledge goes, is filicic acid amorphous. By what process it is made, or whether it corresponds to any of the published descriptions of the acid that passes under this name I do not know. And, moreover, it is not clear that the several principles referred to have all been obtained from *Aspidium Filix Mas*, or whether certain of them are to be found only in other species of *Aspidium*. Extended investigation may show that what are claimed to be educts may be more properly described as products. Filmaron in the near future may fail to maintain its distinctive identity. Nagel's statement deserves to be put to the test of clinical experiment, that the activity of male fern extract as an anthelmintic depends entirely on the age of the drug employed in its preparation, and that only when the fresh drug of the last season's growth is used are satisfactory results obtained. It would be a distinct advantage if a research chemist experienced in the isolation of vegetable principles would take specimens of male fern of varying ages grown in this country and re-examine them, and have tested first chemically, and afterwards clinically, the definite bodies obtained.

Now, since the use of the ethereal extract of male fern in medicine is practically dependent on its value as a vermifuge, it is of first importance that the principle or principles to which it owes its required property should be placed beyond a doubt, or, at least, reasonable controversy, before any recommended process for standardizing it can be accepted. In the present stage of our knowledge neither Daccomo and Scoccianti's, nor Kraft's, nor Stoeder's process for the determination of filicic acid, however accurate for this constituent, can justifiably aspire to measure the anthelmintic value of the extract. Inability to estimate the vermifugal activity of the ethereal extract must not be allowed to act as a deterrent against the application of tests for known and gross adulterants.

Myrrh.

The point to which greater attention should be directed is the

percentage of volatile oil. An examination should be made of a large number of samples carefully verified by an expert, including the following data:—Ash, solubility in 90 per cent. alcohol, saponification number and volatile oil, with the view of ascertaining the feasibility of arriving at percentages, indicative of samples of good quality commercially obtainable, and that would exclude within reasonable limits the more commonly occurring adulterants.

Senega.

If it is permissible to judge of the importance of a drug by the extent to which it is in demand, then senega undoubtedly deserves this distinction. Having regard to the frequency with which its infusion is prescribed in bronchial affections it is singular that the root should have been the subject of chemical examination by so few investigators. The two constituents of recognized importance are senegin and polygalic acid, but whether these principles are identical respectively with the sapotoxin and quillaiac acid of quillaia bark cannot be said to be known with certainty. It is more than probable that the varying results of different investigators are due to the substances isolated not having been finally obtained in the same degree of purity by the different observers. Another point of interest, and respecting which divergent views are held, is the alleged presence of methyl salicylate. Two opinions have been advanced, not necessarily mutually destructive, one that the ester is a product of the slow decomposition of senegin, the other that it exists already formed in the drug. Bourquelot maintains that it is resident in the root potentially in the form of a glucoside, from which it is liberated by the action of a ferment contained in the plant. Kremers and James have conclusively shown that as a means of distinguishing between true and false senegas the methyl salicylate test is utterly fallacious.

Our knowledge regarding the constituents of senega must be pronounced unsatisfactory, at least to the extent that it is insufficient for the purpose of a pharmacological valuation of the drug by chemical processes. With the opinion expressed by Professor Greenish in his materia medica that both senegin and polygalic acid require further investigation, I entirely agree. Dr. Marshall is responsible for the statement "that we do not know the effects to be obtained from the drug alone, and pharmacological experiment does not lend much support to the view

that its good effects more than counterbalance its undesirable actions." A complete reinvestigation of true senega is needed to supply an answer to the questions:—(1) What are the essential constituents; (2) in what proportion do the chief constituents exist; (3) to what principle or principles are due its medicinal virtues or therapeutic properties. Until we are in possession of these facts, and they ought not to be difficult of acquisition, we are not in a position to justify an attempt to assay senega by the estimation of a definite principle.

Veratria.

That this preparation, when made by the process described in the British Pharmacopœia, is a mixture of bases and altered products may be safely affirmed. That it consists chiefly of cevadine (the veratrine of Merck, Schmidt, and Köppen), together with veratrine, and possibly cevadilline, with partially hydrolyzed bases, is not open to serious question. If it is justifiable to assume the individuality of sabadine and sabadinine respectively, it is understood that they are present in proportions too small to intrinsically affect the character of the mixture. That the veratrine of commerce is rarely of English make, and that the permissible process of the Pharmacopœia is too antiquated and too destructive of alkaloidal content to command the acceptance of manufacturers, are more than probable. There is a great need for further experimental work, with the specific object of obtaining reliable information as to the proportion in which the different alkaloids exist in commercial samples of the drug. That our knowledge of the composition of an official substance apparently so complex and so powerful in its action is so meagre, probably arises from the rarity with which the drug is prescribed and the limitation of its use in the form of an unguent to the destruction of pediculi. Inasmuch as in physiological action it greatly resembles aconitine, and as an ointment of the latter is official, its retention in the Pharmacopœia is of doubtful value. If, however, the authorities decide to include in the next edition of the official volume a substance that produces the therapeutic effects of cevadine (veratrine), the present mixture of bases should be replaced by the pure alkaloid.

Concluding Remarks.

And now, having briefly summarized our knowledge regarding some of the more important drugs, it will readily be seen that,

despite the large amount of work done and the high character of much of it, many points still call for investigation. The pharmacist who has the needed experience, leisure, and appliances to assist in the settlement of questions of great moment to medicine will add to his professional status and render a valuable service to the community.

It is my conviction that British pharmacy has made steady and signal advances during the last twenty-five years. Reviewing reflectively that period during the whole of which I have been continuously and practically engaged in the examination of crude drugs and their various preparations, and the making of galenicals on a large scale, I am able from personal knowledge to affirm that the medicines supplied through qualified retail pharmacists are of a quality that was unobtainable less than a quarter of a century ago, a remark that particularly applies to preparations capable of assay by chemical processes. The rubric of this Conference to which every member tacitly subscribes — viz. to maintain uncompromisingly the principle of purity in medicine —is observed more generally and intelligently, though I will not admit with greater fidelity (for the impugnment of honour is not implied), than in the past. That second and third quality drugs are a marketable commodity, and that preparations made from them bearing official names, but not of standard strength, are purchasable cannot be denied. That section of the public who demand to be supplied with cheap drugs do not need to be informed where they can be obtained. To the credit of pharmacy in this country be it said, that amid excessive competition aggravated by legislative enactments that unintentionally but admittedly apply to the disadvantage of the qualified proprietor as against the unqualified owners of impersonal combinations, and despite the temptations to conduct their businesses purely on commercial lines, there are a large number in the craft who practise high-class pharmacy, and of those who are circumstanced where it is not required, many nevertheless take a living interest in its advancement, and there is a small but not inconsiderable remainder of highly trained men who with praiseworthy zeal devote their little leisure to the prosecution of pharmaceutical research. .

To foster the spirit of investigation is the main purpose for which the Conference exists, and the measure in which it has achieved the object of its high calling may be judged by a careful study of the papers communicated to its annual meetings and

published in the *Year-Book of Pharmacy*. In order that the Conference may continue its onward march along the path of usefulness marked out by its founders and approved by their successors it invites the practical support of members of the craft throughout the United Kingdom who are unconnected with it and their loyal co-operation in its persistent endeavour to maintain and promote the highest interests of British pharmacy.

Mr. DRUCE said it devolved upon him as senior vice-president on that occasion to propose a vote of thanks to the President for his able and lucid address. "First let me say," he continued, "that we all deeply sympathize with our dear and beloved friend Mr. Atkins in his recent sad bereavement. We should all like to see him this morning, as it is always a great pleasure to see him. Then we have to regret the absence of Professor Attfield, due to indisposition. I feel sure you will agree with me when I say that Mr. Naylor's address is the embodiment of the practical side of pharmacy. His address is not of the ordinary run of presidential rhetoric, signifying little or nothing, and we do feel that this address of his—although not open to discussion—is brimful of real facts connected with pharmacy. We have had in the course of our history—I may say ancient history—many presidential addresses, and it therefore becomes increasingly difficult for a President to say anything original. Mr. Naylor wisely chose a subject in which he has made himself *facile princeps*, and he has dealt with it admirably. We have at the present day to meet with competition entirely unlike that which we met when holding our meetings in this city twenty years ago. Unfortunately the public has been educated on a wrong standard of thought, and it is hardly possible for us to put that matter right, but I believe the time will come when a different standard will come in force, when cheapness will not be looked upon as the solving of every question, and when flashiness will be looked upon as vulgar. Mr. Naylor's address will no doubt do a deal of good, and I beg to propose a very hearty vote of thanks to him."

Mr. W. G. CROSS, as a member of the local committee, seconded the resolution. In doing so he said: "I am confident I am expressing the unanimous opinion of all present, and I hope the inspiring address given by Mr. Naylor will help pharmacists

throughout the country to work in the manner outlined by him."

Mr. BARCLAY supported the resolution, which was carried with acclamation.

The PRESIDENT briefly acknowledged the vote of thanks.

LETTERS OF APOLOGY FOR ABSENCE

from the following were read by Mr. E. Saville Peck, Hon. Sec. : Sir Oliver Lodge, Professor Attfield, Mr. S. R. Atkins, Mr. N. H. Martin, Mr. Tocher, Dr. G. Coull, Mr. P. MacEwan, Mr. Middleton, Mr. E. F. Harrison, Mr. Dinwoodie, Mr. F. C. J. Bird, Mr. Walter Hills, Mr. J. C. C. Payne, and Mr. E. M. Holmes.

RECEPTION OF DELEGATES.

Mr. EDMUND WHITE, Hon. Sec., then read the list of delegates as printed below :—

Pharmaceutical Society of Great Britain.—Mr. R. A. Robinson (President), Mr. J. Rymer Young (Vice-President), Messrs. Atkins, Carteighe, Cross, Gibson, Gifford, Hagon, Hobbs, Newsholme, Symes, and Wootton.

Pharmaceutical Society of Great Britain (North British Branch).—Mr. D. B. Dott (Chairman), Mr. J. P. Gilmour (Vice-Chairman), Messrs. Giles, Glass, Nesbit, J. Tocher, and W. P. Wilson.

Pharmaceutical Society of Ireland.—Dr. Walsh (President), Messrs. J. Smith (Vice-President), Beggs, Hardy, Watson, and Wells.

Bradford and District Chemists' Association.—Messrs. Hanson and Silson.

Brighton Association of Pharmacy.—Messrs. Cripps, Robinson and Savage.

Bristol Pharmaceutical Association.—Mr. H. E. Boorne.

Cambridge Pharmaceutical Association.—Messrs. B. S. Campkin and E. S. Peck.

Cheltenham and District Chemists' Association.—Messrs. Barron and Thomas.

Chemists and Druggists' Society of Ireland (Belfast).—Mr. W. J Gibson.

Edinburgh Chemists' Assistants' and Apprentices' Association.—Messrs. Cowie, Currie, Duncan, Glass, and Hill.

Exeter Association of Chemists and Druggists.—Messrs. I. W. Aplin, H. W. Gadd, and J. H. Lake.

Forfarshire and District Chemists' Association.—Messrs. Burrel and Hutton.

Glasgow and West of Scotland Chemists' Association.—Messrs. Brodie and Gilmour.

Liverpool Chemists' Association.—Messrs. T. F. Abraham, J. N. E. Evans, Wm. P. Evans, and C. Symes.

London Chemists' Association.—Messrs. Leo Atkinson, Feaver-Clarke, Glyn-Jones, Holding, Truman, and J. C. Umney.

London Western Chemists' Association.—Messrs. E. White (Vice-President), J. H. Mather and F. A. Rogers.

Manchester Pharmaceutical Association.—Messrs. Balmforth, Franklin, Grier, C. A. Johnstone, Kemp, Kirkby, Pidd, Wild, and G. S. Woolley.

Newcastle-on-Tyne and District Chemists' Association.—Messrs. Clague, Foggan, and Gilderdale.

Nottingham and Notts Pharmaceutical Association.—Messrs. Adamson, Eberlin, Middleton, and Parkes.

North Staffordshire Chemists' Association.—Messrs. Averill, Bentley, E. Jones, and Marson.

Oxford and District Chemists' Association.—Messrs. Clayton and Druce.

Sheffield Pharmaceutical and Chemical Society.—Messrs. Antcliffe, Appleton, Carr, Dixon, Fox, Jackson, Newsholme, Pater, Upsher Smith, and H. G. Williams.

Annual Report of the Executive.

Mr. Peck then presented the annual report as follows :—

"The Executive Committee, in presenting their forty-third annual report, are glad to be able to state that the interest in the proceedings of the Conference continues to be well maintained. Since the presentation of the last report, thirty-four members have resigned, while no less than 250 new members have been elected, a result largely due to the efforts of our Birmingham friends and the local corresponding secretaries throughout the country, whom we wish specially to thank. We believe the success which has attended their work will prove an incentive to further efforts in the future. The Conference has to deplore the death of J. B. Stevenson, President, and A. Strachan, Local Secretary, respectively, of the Conference at Aberdeen in 1885. The Research Sub-Committee has met upon three occasions, and thoroughly revised the research list. We trust that members will work out several of the problems there mentioned during the year. Two hundred and six copies of the General Index have

been sold since the last annual meeting, and your Executive feel that a larger number should have been purchased by the members, seeing that the volume renders the *Year-Books* so much more valuable as works of reference. Further, in view of the large expense entailed by the publication of this General Index, your Committee appeal to the members generally to show their appreciation by acquiring copies. As the result of the special appeal, we have pleasure in reporting that an amount has been subscribed nearly sufficient to defray the cost of the Index. The MSS. of abstracts for the *Year-Book* are already in the printer's hand, and publication of the *Year-Book* may be expected at an earlier date than usual. We trust that the members generally will support the Executive in endeavouring to secure further additions to the membership, and to encourage those already elected to continue their interest in the Conference in order that its work may be efficiently maintained."

On the motion of Mr. D. B. Dott, seconded by Mr. Grice (Calcutta), the report was adopted.

Financial Statement.

Mr. J. C. Umney, Treasurer, in presenting the financial statement, said it was satisfactory to note that the membership was stronger than last year by something like 200. Unfortunately they were £111 to the bad, but this was partly due to the fact that notices had been sent out later than usual this year. But he was not despondent, and he thought the prospects of clearing off the debt were good. Referring to the Index, he mentioned that 500 copies had been printed, and 200 had been sold. There had been a deficit of £211 on the Index account, but this amount had been reduced to £25, as a consequence of the special appeal that had been made.

Mr. Tyrer, in proposing that the report be adopted, expressed the hope that the technical and scientific standard of the *Year-Book of Pharmacy* would not be lowered owing to lack of funds, and spoke of the value of an Index.

Dr. Symes seconded, and in the course of his remarks suggested that there should be a secondary list published of donations to the Conference. If each one sent up 10*s.* instead of 7*s.* 6*d.* it would give an increase of 25 per cent., and the Conference would not then always be in its present state of poverty.

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1906.

The British Pharmaceutical Conference.

1905.	Dr.	£	s.	d.	£	s.	d
July 1.	To assets forward from last year—						
	,, Cash at Bank	86	5	11			
	,, ,, in Secretary's hands	3	15	9			
					90	1	8
1906.							
July 1.	To Members' Subscriptions	285	9	3			
	,, Amount received for "Index"	30	10	3			
					315	19	6
	,, Sale of *Year-Book* by Publishers	14	6	8			
	,, Sales of *Year-Book* by Secretary	1	17	6			
	,, Sales of "Index" by Publishers	2	2	0			
					18	6	2
	,, Advertisements in *Year-Book*	78	15	10			
	,, Sale of Formulary	1	14	7			
					80	10	5
	,, Liabilities on Open Accounts—						
	Butler & Tanner	190	18	5			
	McCorquodale and Co.	2	14	0			
	Due to Assistant Secretary for Salary and Rent for one quarter, ending June 30	13	15	0			
					207	7	5
	,, Bell and Hills Fund				25	1	7
					£737	6	9

N.B.—Deficit, July 1, 1906, is £111 9*s.* 4*d.*

	£	s.	d.
Liabilities	207	7	5
Assets	95	18	1
	£111	9	4

1905. July 1.	Cr.	£	s.	d.	£	s.	d.
By Bell and Hills Fund from last year					26	6	4
1906.							
„ Expenses of *Year-Book* for 1906—							
„ Printing, Publishing, and Binding		188	2	2			
„ Banding and Parcelling		2	16	3			
„ Posting and Distributing		24	17	5			
„ Advertising, £1 11*s.*, Publishers' charges, 1*s.*		1	12	0			
„ Commission on Advertisements		19	13	10			
					237	1	8
„ Editor's Salary					100	0	0
„ Publishers' Commission on Sale of "Formulary"					0	3	6
„ Sundry Expenses—							
Assistant Secretary—Annual General Meeting		10	0	0			
Assistant Secretary's Salary for one year to date		45	0	0			
Rent of Office		10	0	0			
Postages, £10 8*s.* 10*d.*; Editor, 15*s.* 3*d.*		11	4	1			
					76	4	1
„ Printing and Stationery—							
McCorquodale & Co.		9	2	6			
Editor		0	7	4			
					9	9	10
„ Petty Cash		3	16	7			
„ Foreign Journals for Editor		5	2	0			
„ Bank Charges		0	1	9			
					9	0	4
„ Liabilities of last year, since paid—							
Butler & Tanner		165	12	5			
McCorquodale & Co.		3	15	6			
Assistant Secretary's Salary		13	15	0			
					183	2	11
„ Cash in Secretary's hands		0	12	1			
„ Balance at Bank		95	6	0			
					95	18	1
					£737	6	9

The Bell and Hills Fund.

1905.		£	s.	d.	£	s.	d.
July 1.	To balance from last year	26	6	4			
	„ One year's Dividend on Consols	8	11	0			
					34	17	4
Aug.	By Kimpton, H., Account for Books				9	15	9
					£25	1	7

Assets—
In account with British Pharmaceutical Conference.
£360 2½ per cent. Consolidated Stock.

The British Pharmaceutical Conference Research Fund.

1905.		£	s.	d.
July 1.	To Balance	38	5	0

Examined and Found correct, July, 1906.
J. W. Bowen,
W. Prior Robinson.

Or it might be better to adopt a suggestion which he made some years ago, that the subscription be increased to 10*s.*

After some discussion, in which Messrs. Wakefield, Gerrard, Dr. Walsh, and others joined, Mr. ALLMAN proposed that the subscription be raised to 10*s.* 6*d.*, and that the recommendation should go forward to the Executive Committee.

Mr. TYRER seconded, and, on the motion being put to the meeting, it was carried by seventy-five to five.

The PRESIDENT said there was a deficit of £25 on the Index, and it was desirable that the amount should be paid off. He appealed to those attending the Conference to make up this deficit if possible. The motion for the adoption of the report was then put and carried.

VISITORS FROM THE COLONIES.

The PRESIDENT extended a warm welcome to the Colonial visitors present that day: Mr. and Mrs. Clayton (South Australia), Mr. and Mrs. McJannet (Cape Colony), Mr. W. Grice (Calcutta), and Mr. Moore (Assam).

Mr. CLAYTON thanked the President for his kind reference to the visitors from the Colonies. He mentioned that the door of Australia was always open to English chemists, but unfortunately at the present day Australians who had passed examinations out there were not recognized for registration in Great Britain. During the last three weeks he had had the opportunity of visiting Bloomsbury Square, where he had been very courteously received.

Messrs. GRICE and MOORE also expressed their gratitude to the President for his reference to them.

The reading of papers communicated to the Conference was then proceeded with.

THE NITRIC ACID PROCESS FOR THE DETERMINATION OF STRYCHNINE.

BY E. H. FARR, F.C.S., AND R. WRIGHT, F.C.S.,

Pharmaceutical Chemists.

Since the issue of the British Pharmacopœia, 1898, the pharmacists of the United Kingdom have necessarily followed the

ferrocyanide process for the determination of strychnine, and, with certain modifications, the official process may be trusted to give substantially accurate results. The subsequent publication of Keller's process, and Gordin's modification of the same, and its adoption by the United States authorities have aroused a good deal of interest in this country, and notes have been published by Dowzard,[1] Howard,[2] and Reynolds and Sutcliffe,[3] showing that by varying the quantity of nitric acid used, and operating at low temperatures the complete oxidation of the brucine may be accomplished without appreciably affecting the strychnine.

Some experiments made by us at the time of the publication of the U.S. Pharmacopœia showed that, notwithstanding the condemnation of the process as contained therein by several analysts in this country, that process, with slight modifications in the working details, does give perfectly satisfactory results, and, as subsequent work has thoroughly established its reliability, we think the matter of sufficient interest and importance to bring before the members of this Conference.

The *modus operandi* prescribed in the U.S.P. is as follows: The mixed alkaloids are extracted and dissolved in 15 mils of sulphuric acid (3 per cent.), 3 mils of a cooled mixture of equal volumes of nitric acid (1·4) and distilled water are added, and the whole set aside for exactly 10 minutes. The mixture is then made alkaline, and extracted with chloroform.

In order to test the process, the following experiments were carried out on the alkaloids strychnine and brucine, separately and in conjunction.

I.—Experiments with Strychnine.

Experiment 1.—*U.S.P. process on strychnine at ordinary temperatures.*

Strychnine Taken	Strychnine Recovered.
(*a*) 0·075	0·0745
(*b*) 0·175	0·175

Experiment 2.—*U.S.P. process on strychnine, the nitric acid being added at 50°C.*

Strychnine Taken	Strychnine Recovered.
(*a*) 0·1125	0·1125
(*b*) 0·1125	0·1125

[1] *Chem. News* (87), 99.
[2] *Analyst*, 1905 (30), 261–3.
[3] *Ph. J.*, 76, p. 555.

Experiment 3.—*U.S.P. process on strychnine, but mixture heated to* 65°*C., after adding nitric acid.*

Strychnine Taken.	Strychnine Recovered.
(*a*) 0·092	0·0875
(*b*) 0·159	0·15

Experiment 4.—*U.S.P. process on strychnine, but alkaloidal solution raised to* 100°*C. before adding the nitric acid.*

Strychnine Taken.	Strychnine Recovered.
(*a*) 0·815	0·0755
(*b*) 0·094	0·088

II.—Experiments with Brucine.

Experiment 1.—*U.S.P. process on brucine at ordinary temperatures.*

Brucine Taken.	Brucine Recovered.
0·084	0·0767

Experiment 2.—*By U.S.P. process, but mixture heated to* 38°*C. for ten minutes.*

Brucine Taken.	Alkaloid Recovered.
0·0767	0·0022

Experiment 3.—*By U.S.P. process, but mixture heated to* 50°*C. for five minutes.*

Brucine Taken.	Alkaloid Recovered.
0·0907	0·0027

Experiment 4.—*By U.S.P. process, but mixture heated to* 50°*C. for thirty minutes.*

Brucine Taken.	Alkaloid Recovered.
(*a*) 0·0847	0·0006
(*b*) 0·074	0·0005 about

The residues from these brucine experiments gave no characteristic reaction, either for strychnine or brucine. They readily dissolved in dilute acid and responded to the usual alkaloidal reagents. Heated with strong sulphuric acid they charred. These facts point to the presence of a third alkaloid as an impurity in brucine.

III.—Experiments on the Mixed Alkaloids.

	Strychnine Taken.	Brucine Taken.	Strychnine Recovered
(1)	0·037	0·142	0·037
(2)	0·066	0·089	0·0657
(3)	0·047	0·198	0·048
(4)	0·112	0·105	0·1115

These experiments are quite sufficient to prove that the U.S.P. process, if carefully worked, gives accurate results under simple

conditions. The exact details of the process as we have applied it are as follows: The total alkaloids obtained in the usual way from 5 mils of the liquid extract, or 25 mils of the tincture, are dissolved by the heat of a water-bath in 15 mils (3 per cent.) sulphuric acid, the temperature of the solution adjusted to 50°C., 3 mils of a mixture of equal volumes nitric acid (sp. gr. 1·42) and water added, and the mixture set aside for 10 minutes. It is then transferred to a separator, 50 mils solution of potash, B.P., and 10 mils of chloroform added, and the mixture well shaken. After separation, the chloroform is run into a tared dish containing 3 mils amylic alcohol, and the agitation repeated with two further portions of 5 mils chloroform. The dish is placed in a current of warm air to allow the chloroform to escape, and the final evaporation and drying completed over a water-bath. The strychnine is sometimes obtained in fine perfectly white crystals, but is usually slightly tinted, as pointed out by E. F. Harrison in *The Pharmaceutical Journal* for March 10, 1906 (p. 305).

STANDARDIZED POWDERED ALCOHOLIC EXTRACTS.

No. 5.—EXTRACT OF NUX VOMICA.

By E. H. Farr, F.C.S., and R. Wright, F.C.S.,

Pharmaceutical Chemists.

This extract, with the corresponding tincture, are, perhaps, the most frequently prescribed of all the official galenicals, and it is interesting to trace the changes in the mode of their production, as illustrating the improvements which have resulted from the application of scientific principles to the practice of pharmacy. Both extract and tinctures are found in the 1867 Pharmacopœia, the former being directed to be prepared by steaming the seeds, drying them rapidly, powdering, exhausting the powder by boiling with successive portions of rectified spirit, recovering the alcohol, and evaporating the residue to a soft extract, the latter by maceration and percolation of the fine powder with rectified spirit. The strength of the tincture was 1 in 10 w/v. In the 1885 Pharmacopœia the spirit strength of the menstruum was reduced and the extract prepared from a 1 in 5 percolate of the powdered seeds and standardized to

contain 15 per cent. total alkaloid. The tincture was made by simple solution of the extract in 80 per cent. alcohol, and contained 1 grain alkaloids per fluid ounce, or practically 0·225 per cent.

In the present Pharmacopœia both preparations are directed to be made from a 1 in 1 liquid extract prepared from the seeds with a 70 per cent. menstruum, and standardized to contain 1·5 per cent. strychnine. In each case a strychnine standard has been substituted for one of total alkaloids, that for the extract being 5 per cent., and for the tincture 0·25 per cent.

Total Alkaloids in Nux Vomica.

The following figures show the range in the percentage of total alkaloids in nux vomica, as recorded by various workers :—

Worker.	Source.	Minimum.	Maximum.	Average.
Dunstan and Short	Bombay	3·14	3·90	3·53
,, ,,	Cochin	3·04	3·60	3·32
,, ,,	Madras	2·74	3·15	2·94
,, ,,	Ceylon	4·4	5·3	not given
,, ,,	Commercial powders	2·56	3·38	3·15
Kremel	,, ,,	1·84	2·76	not given
Beckurts	,, ,,	2·17	2·38	,,
Keller	,, ,,	2·64	2·88	,,
Landon	,, ,,	2·73	3·13	,,
Andrews	.. ..	2·84	3·00	2·93
Farr and Wright	,, ,,	2·48	2·97	2·80

Strychnine in Nux Vomica.

The proportion of strychnine in nux vomica and the relative amounts of strychnine and brucine in the total alkaloids recorded by different workers do not show such wide variations as to warrant the extreme statements on the subject found in some text-books. F. C. J. Bird [1] quotes 0·7 and 1·5 per cent. strychnine in the seeds, and E. A. Andrews [2] gives an average for twelve samples of 1·23 per cent., the maximum being 1·54, and minimum 1·0 per cent. Strange to say, these figures almost exactly coincide with ours, as will be seen by reference to the following table :—

[1] *Assay of Ipecacuanha*, etc., p. 52.
[2] *Pharm. Journ.*, 69, p. 495.

No.	Total Alkaloids.	Strychnine.	Brucine.
1	2·75	1.14	1·61
2	2·94	1·50	1·44
3	3·02	1·08	1·94
4	2·97	1·44	1·53
5	2·58	1·20	1·38
6	2·78	1·14	1·64
7	2·48	1·14	1·34
Average .	2·8	1·23	1·55

It will be remarked that the minimum amount of strychnine found either by Andrews or ourselves in nineteen commercial samples of the drug was 1 per cent., and that the ratio of strychnine to brucine in the total alkaloids varies between the limits of 1 to 1 and 1 to 1·8. Among previous workers, Dunstan and Short give the limits of ratio (for alkaloids from the extract) as from 1 to 1 to 1 to 1·79, and Andrews from 1 to 1 to 1 to 1·18.

The conclusion is that in the vast majority of samples the quantity of brucine is greater than that of the strychnine. In only two samples examined by us has the opposite been the case. In the seeds of *Strychnos ignatia* the conditions appear to be reversed. Thus, Harrington [1] gives 1·2 strychnine to 0·41 brucine; Coblentz [2] (five samples), total alkaloids 3·9 to 4 per cent., with strychnine 2·2 to 3·6 per cent.; while F. Ransom [3] reported total alkaloids ranging from 1·7 to 3 per cent., with the strychnine and brucine in almost equal proportions. A sample examined by ourselves gave 2·65 per cent. total alkaloids, of which 1·7 per cent. was strychnine and 0·95 per cent. brucine (almost 2 strychnine to 1 brucine). We think it desirable that an official standard should be fixed for nux vomica seeds. Mr. John Umney has proposed a standard of from 2 to 2·5 per cent. total alkaloid, of which one-half should be strychnine. There are, however, certain objections to the setting up of a double standard, and seeing that the difference in the physiological action of the two alkaloids appears to be merely one of degree, it would perhaps be preferable to fix a strychnine standard both for nux vomica and its preparations, which should include the brucine, expressed, if possible, in terms of strychnine.

[1] *Amer. Journ. Pharm.*, 1886, p. 14.
[2] *Amer. Journ. Pharm.*, 1886.
[3] *Year-Book of Pharmacy*, 1894.

Assay of Nux Vomica.

This is performed upon the powdered drug, and the following methods have all in our hands been found to give reliable results if carefully worked :—

1. *Dunstan and Short's Process.* Five Gm. of the powder is exhausted in a Soxhlet or other extraction apparatus for 1 or 2 hours with a mixture of 40 mils chloroform and 10 mils alcohol, and the alkaloids shaken out and purified in the usual way.

2. *Bird's Process.* Five Gm. of the powder is triturated in a mortar with 2 mils of 10 per cent. solution of potash until uniformly moistened, and is then exhausted by extraction with a mixture of 4 vols. ether, 3 vols. chloroform, and 1 vol. amylic alcohol.

3. Five Gm. of the powder is damped with a menstruum consisting of 70 per cent. alcohol containing 5 per cent. acetic acid B.P., packed in a small glass tube, to which an air-pressure ball has been attached, and exhausted by percolation under pressure with successive small portions of the menstruum until the percolate passes colourless and the residue from a few drops of the same fails to respond to Mayer's reagent.

4. *Keller's Process Modified.* This is carried out exactly as in the case of Bird's, but the powder is not moistened before being added to the menstruum. For the latter we have employed a mixture consisting of 6 vols. ether, 2 vols. chloroform, and 1 vol. ammoniated alcohol. From the bulked percolates the alkaloids are shaken out with an excess of dilute sulphuric acid.

In the working of the above processes particular attention needs to be directed to the complete exhaustion of the drug. Of the four, the last-mentioned appears to effect this more rapidly than the others.

Ratio of Alkaloids to Extractive.

Dunstan and Short's experiments[1] showed that the soft extract of the 1867 Pharmacopœia contained from 10·32 to 17·12 per cent. total alkaloids, average 14·7 per cent., or calculated on the dry extract from 12·1 to 20·4 per cent., average 17·3. The strychnine in the same samples ranged from 4·19 to 8·59 per cent. in the soft extract, average 6·34, or 4·9 to 10·2 in the dry, average 7·4 per cent.

[1] *Year-Book of Pharmacy*, 1884, p. 273.

Some years ago we published the results of experiments made with the object of ascertaining the volume of menstruum required to complete the exhaustion of some of the most important drugs of the Pharmacopœia. With this object in view, 100 Gm. of the powdered drug was subjected to percolation, the percolate being collected in fractions of 100 mils. Each fraction was therefore equal, volume for weight, to the quantity of the drug taken for experiment.

In the note referred to [1] we showed that the practical exhaustion of most drugs could be effected by the employment of drug and menstruum in the proportion of 1 to 3 or 1 to 4, and that in the case of nux vomica the first 1 in 1 percolate actually contained about 80 per cent. (4–5ths) of the total alkaloid in the drug. The figures for the various fractions of nux vomica percolate are subjoined :—

ALKALOIDS.

No.	Fraction 1.	Fraction 2.	Fraction 3.	Fraction 4.	Fraction 5.
1 . .	1·825	0·336	0·044	0·020	0·014
2 . .	0·850	0·172	0·050	0·019	0·006

DRY EXTRACT AT 100°C.

No.	Fraction 1.	Fraction 2.	Fraction 3.	Fraction 4.	Fraction 5.
1 . .	13·98	2·12	0·44	0·22	0·16
2 . .	5·92	1·14	0·39	0·21	0·13

Adding these figures together, we find that the dry extract from one sample contains 13·2 per cent. alkaloids, and the other 14·1 per cent. In each case we might expect from 6 to 7 per cent. strychnine in the dry extract.

In order to supplement the above results, and more especially to get at the strychnine value of dry extracts of nux vomica by actual experiment, we took 1,500 Gm. of the drug in No. 40 powder, distributed this equally among four percolators, and exhausted it by re-percolation. The percolate from the last percolator was collected in six fractions, each consisting of 750 mils. In each of these fractions the proportions of dry

[1] *Year-Book of Pharmacy*, 1893, pp. 358–9.

extract, total alkaloids and strychnine were determined, and the results are set out, expressed in percentages, in the following table :—

Table showing percentage of dry extract, strychnine, etc., from fractions of nux vomica percolate.

Fraction.	Dry Extract.	Total Alkaloids.	Strychnine.	Brucine By difference.
1	10·02	1·560	0·780	0·780
2	3·38	0·440	0·180	0·260
3	2·88	0·292	0·148	0·144
4	1·26	0·080	0·044	0·036
5	0·50	0·032	0·020	0·012
6	0·50	0·024	0·014	0·010

The totals from the different fractions indicate 13·1 per cent. total alkaloids in the dry extract, as compared with 13·2 and 14·1 per cent. recorded in our previous work.

Experiments on Menstrua.

The following experiments were set on foot in order to ascertain the extent to which the alkaloidal strength of the extract was affected by varying the alcoholic strength of the menstruum employed. The samples of drug operated upon contained the following percentages of total alkaloid and strychnine :—

No.	Total Alkaloids.	Strychnine.
1	2·94	1·50
2	2·97	1·53
3	2·48	1·14

The *modus operandi* consisted in slightly damping 100 Gm. of the powder with the menstruum, packing in a conical percolator, and allowing percolation to proceed until 400 mils of percolate had been collected. The dry extract, total alkaloids and strychnine in the percolate were determined by the usual methods. The results are shown on the following table :—

Table showing percentage amounts w, v of dry extract, alkaloids, etc., yielded by the percolates.

No.	DRY EXTRACT. 90 Per Cent. Menstruum.	80 Per Cent. Menstruum.	70 Per Cent. Menstruum.	60 Per Cent. Menstruum.	TOTAL ALKALOIDS. 90 Per Cent. Menstruum.	80 Per Cent. Menstruum.	70 Per Cent. Menstruum.	60 Per Cent. Menstruum.
1	1·94	3·12	3·60	3·70	0·292	0·548	0·588	0·644
2	1·78	2·86	2·88	3·16	0·272	0·455	0·476	0·700
3	2·55	3·38	3·80	3·40	0·240	0·400	0·456	0·400
	STRYCHNINE.				BRUCINE.			
1	0·144	0·260	0·264	0·296	0·148	0·288	0·324	0·348
2	0·130	0·229	0·226	0·316	0·142	0·226	0·250	0·384
3	0·112	0·178	0·208	0·176	0·128	0·222	0·248	0·224

Percentage of strychnine in dry extracts.

No.	90 Per Cent. Menstruum.	80 Per Cent. Menstruum.	70 Per Cent. Menstruum.	60 Per Cent. Menstruum.
1	7·42	8·33	7·33	8·0
2	7·32	8·00	7·84	10·0
3	4·40	5·26	5·47	5·17

NOTE.—In working with the 60 per cent. menstruum in sample 3 the percolator became blocked, and had to be emptied and recharged. The results are therefore somewhat lower than would otherwise have been the case.

The results recorded on the table point to the fact that within certain limits a 60 per cent. menstruum exhausts the drug better than either a 70 or 80 per cent. It does not follow that it is the best menstruum to employ in this particular case, as percolation takes place very slowly, and the percolate is not clear.

Apart from this, the results of the experimental work clearly show that where a sample of nux vomica of good quality is taken no difficulty whatever will be experienced in preparing a dry extract containing 5 per cent. strychnine. The drug used for the purpose must contain at least 1 per cent. of strychnine; it is better, in fact, to select one containing 1·25 per cent. or more.

Liquid Extract of Nux Vomica.

Since the introduction of this preparation into the Pharmacopœia it has caused a great amount of trouble and annoyance to pharmacists. Difficulties have arisen with respect to the official assay process, the presence of fat, and other questions. With regard to the official standard, it is evident that somebody has blundered badly, for it is palpably impossible to produce from a drug which rarely contains as much as 1·5 per cent. of strychnine, a 1 in 1 preparation standardized to that amount. The result of fixing an impossible standard has been that pharmacists have found it necessary to increase the quantity of drug ordered in the Pharmacopœia for the production of a given amount of liquid extract, the consequence being a preparation overloaded with fatty matter. The root of the difficulty lies in the shifting of the basis of the doses of many of the galenical preparations of the present Pharmacopœia as compared with the last, and the adoption in many cases of more or less artificial standards. This change was introduced simply for the convenience of the members of the medical profession. From the pharmaceutical standpoint it is a great mistake, and if persisted in will lead to much future trouble for pharmacists. The matter was fully discussed by Mr. Maben at the last meeting of this Conference,[1] and it would be difficult to exaggerate its seriousness in its bearing upon the future course of pharmacy in this country.

The natural standards for nux vomica and its preparations are those of the present U.S.P., viz., 1·25 per cent. of strychnine for the drug, 5 per cent. for the powdered extract, 1 per cent. for the fluid extract, and 0·1 per cent. for the tincture. The difficulty attending the production of the standard liquid extract of the B.P. is well illustrated by the following example.

A batch of the liquid extract was prepared from a commercial sample of the drug strictly according to the official formula. The finished product contained 2·46 per cent. total alkaloids, of which 1·10 per cent. was strychnine and 1·36 per cent. brucine. It yielded 13·7 per cent. dry extract w/v, containing 8·03 per cent. strychnine. A further batch was prepared from a second sample of drug, but for the normal quantity of the preparation just twice the specified amount of the drug was taken, the product being to all intents and purposes a 2 in 1 preparation.

[1] *Year Book of Pharmacy*, pp. 374, *et seq.*

This contained 2·97 per cent. of total alkaloids, of which 1·74 per cent. was strychnine and 1·23 per cent. brucine. It yielded 24·25 per cent. of dry extract, containing 12·24 per cent. total alkaloids and 7·17 per cent. strychnine.

Alkaloidal Standards for Nux Vomica.

One of the clearest indications of the progress of pharmacy during the present generation has been the movement in favour of standardization. In the case of drugs which owe their activity to alkaloids, it is now generally recognized that a standard of total alkaloids affords in most instances a fairly accurate measure of their clinical value. In some cases, moreover, it happens that one particular alkaloid is of such supreme importance that in the fixing of a standard the others may safely be ignored. Examples of this kind are extremely rare, and were it not for the fact that although practically ignored for standardization purposes they still remain in the preparation, contributing their share towards its therapeutic effect, strong objection would doubtless have been raised to their being left out of account. In the fixing of the standards for nux vomica, for example, is it safe to treat the brucine present as *une quantité négligeable* ? Granted that its physiological potency is relatively small in comparison with that of strychnine, it is by no means inert, and is always present in nux vomica and its preparations in a proportion sufficiently large to exert a considerable influence upon their therapeutic effect. Now, according to the leading authorities, the action of brucine is similar to, but weaker than that of strychnine, and may be conveniently expressed in terms of the latter ; and if such be the case, why should not the brucine be calculated into terms of strychnine and a strychnine standard be established upon the dual basis ?

Preparation of the Standardized Extract.

The following is the process recommended. Take :—

Nux Vomica, in No. 20 powder .	any convenient quantity.
Hard Paraffin	of each a sufficiency.
Alcohol, 70 per cent. . . .	

Moisten the powder with one-fourth its volume of the menstruum, set aside for six hours, pack in a conical percolator, pour more menstruum over the marc, and allow percolation to proceed slowly but continuously until a volume of percolate has

been collected equal to three times the bulk of the powder taken w/v. Express the marc, and add the pressings to the percolate. Recover the alcohol by distillation, transfer the residual liquid to a suitable bottle, rinse the still out with hot water, adding the rinsings to the other liquid. Introduce into the bottle a quantity of paraffin wax equal to 5 per cent. the volume of the liquid, raise the temperature by standing the bottle in hot water until the wax is completely melted, and, maintaining the mixture at this temperature, shake well and frequently during half an hour. Pour the mixture into an evaporating dish, and allow to stand until the wax has completely separated from the liquid and formed a cake upon the surface. Break through the latter, and run off the liquid; then melt down the wax, add a little hot water, mix well, and set aside till cold. Recover the washings and add to the bulk of the liquid extract. The dry extract, total alkaloids and strychnine in the latter are then determined, and from the data obtained the whole of the reserved liquid is converted into a powdered extract containing 5 per cent. of strychnine, by the addition either of milk sugar or a standard powdered nux vomica, the evaporation being conducted over a water-bath. The product is to be preserved in well-corked or glass-stoppered containers.

Assay of the Powdered Extract.

This can be effected by any of the processes given under powdered nux vomica, preference being given to the modified Keller process for the isolation of the total alkaloids. The same, or practically the same, process has been described and recommended by W. H. Lenton, and we have thoroughly proved its reliability. The strychnine is determined by the nitric acid process.

Microscopic Recognition of the Powdered Extract.

In cases where powdered nux vomica has been employed as diluent the powder may easily be identified by the histological features of the latter, especially by the large proportion of fragments of hair from the seed coat, which are very characteristic.

(For full description of powdered nux vomica, with illustrations, see Greenish and Collin's *Anatomical Atlas*.)

The President said he was sure they had all followed with interest the reading of these two papers by Mr. Wright. They

were of an eminently practical character, and he saw before him gentlemen who were capable of discussing them. He hoped they would take advantage of the opportunity now offered them.

Mr. Dott said that he and his assistants had carefully compared Farr and Wright's method for the determination of strychnine with that of the B.P., and found it to give very concordant and satisfactory results; and as the process was less liable to error than the present official method, it would be well to adopt it in the next Pharmacopœia. When working with the nitric acid process, it was desirable to have in solution the amount of alkaloids approximately for which the process was intended, i.e. if the extract were much stronger or weaker than normal, it was better to repeat the operation with a smaller or greater volume, as might be indicated.

Mr. J. C. Umney, after congratulating the authors on another in their long series of contributions to practical pharmacy, asked Mr. Wright for particulars of recent pharmacological research on the similarity in action and relative strength of strychnine and brucine. Mr. Wright suggested the calculations of brucine to strychnine strength, but if brucine were only 1-30th of the strength of strychnine, then 1·25 per cent. of brucine would only equal 0·04 of strychnine, and would not equal the limit of experimental error in the alkaloidal assay. He was glad to note Mr. Wright found the use of paraffin wax valuable for removing fat. He had used it for years in making a miscible liquid extract of nux vomica. He objected to the use of powdered nux vomica seeds as a diluent for extract, as they contained oil which it was a pity to re-introduce after it had been once removed in making the solid extract. The solid extract was not, of course, much used for re-solution, but it might be under certain conditions.

Mr. E. W. Mann thought that Messrs. Farr and Wright should take greater credit for their nitric acid separation than merely to allude to it as an alteration of conditions of the U.S.P. test; this latter specifically called for previously cooled acids, a process which in his hands had yielded absolutely worthless results. Messrs. Farr and Wright heated the reaction mixture to 50°C., and obtained results more in accordance with those obtained by the original Keller method. He doubted whether the dry extract recommended would keep, and thought that the author's recommendation to use exhausted marc as a diluent was highly advisable, since the use of milk sugar had the unfortunate pro-

perty of forming a hygroscopic powder with a tendency to form a solid lump.

Mr. F. H. Alcock desired to speak with reference to the fat in nux vomica, for it was in Birmingham that attention was first called to the presence of fat in nux vomica preparations. It was not desirable to pick up fat and then remove it in a subsequent operation. As had been shown, the fat in nux vomica preparations was of two kinds, the ester fat and the free acid fat; the former could be got rid of—as was suggested in Caspari's *Treatise on Pharmacy* a few years ago—by the process of refrigeration, while the other fats could not so be got rid of because they were soluble in alcohol. In order to ensure a marc which is free from fat, to begin with there were many solvents which had been used and suggested, but none in his judgment was so good in every way as carbon tetrachloride for this purpose. This was a cheap liquid, non-inflammable, very volatile, and, if pure, had no objectionable odour, and supplied what was required. The paraffin process suggested did not appear to be good, not because it would not be effectual, but because it might leave a taste behind of paraffin, which would be objectionable to delicate tastes. He had always found a difficulty in understanding what became of the brucine in the Keller test, and he would be glad if Mr. Wright would inform them as to the chemical reaction which ensued when the nitric acid changed the alkaloid from this nature to a non-alkaloidal substance. The remark that Mr. Wright's experiments lead him to suggest the presence of a third alkaloid as an impurity in brucine corroborated the suggestion which he (Mr. Alcock) made in 1903, that there was probably a third alkaloid in nux vomica. With reference to the question as to the best alkali for use in this assay process, ammonia, potash and soda had been suggested; Keller refers to the latter, whilst Mr. Wright mentioned potash. One would like to know which was the best for the purpose of rendering alkaline the alkaloidal solution before treatment with chloroform. In conclusion, Mr. Alcock said they were all greatly indebted to both authors for their continued work, which was highly appreciated by the whole of the pharmaceutical world.

Mr. H. W. Gadd said he should not presume to criticize in any detail the very valuable paper under discussion. Messrs. Farr and Wright were authorities on this particular subject. He would like to ask, however, why they had discarded the titration of the strychnine residue which was recommended in

the U.S.P. There was no doubt that the nitric acid process was very convenient, and it was satisfactory to learn that it had been proved to be trustworthy. He was not in favour of frequent changes in the strength of poisonous preparations, and asked why it was necessary to remove the fat from the preparations when, in grinding the seeds, the hairs, which had been shown to contain the greater part of the fat, were automatically removed. In conclusion, he wished to thank the learned authors for the additional obligation under which they had put the Conference.

Mr. J. Rutherford Hill remarked that the paper on nux vomica was based on the assumption that the action of the drug was really due to the strychnine. The statements on that point were rather vague, but it was alleged that strychnine and brucine were identical in physiological action, although they differed widely in intensity. If that view was correct, he did not see why they should not make a definite preparation of strychnine which could be obtained in a state of purity and at a cheap rate. That was pre-eminently a case calling for the co-operation of the pharmacologist and the pharmacist, and no pharmacologist could have better colleagues for work of that particular kind than Messrs. Farr and Wright. He would like to ask Mr. Wright what was his experience as to the keeping qualities of the powdered extract of nux vomica. Mr. Duncan read a paper at a meeting of the Pharmaceutical Society in Edinburgh on the powdered extract of nux vomica, and exhibited a sample which looked all right, but on being kept some months had become a solid cake. That seemed to be the great difficulty, and the fact that the authors recommended powdered extracts to be preserved in well-corked or glass-stoppered containers indicated that probably they had encountered the same difficulty. He could not see why they should not have a standardized powder which could be used by the retail pharmacist in the manufacture of tincture of nux vomica. Mr. Dey, in a paper which he had read at Edinburgh, showed that nux vomica powder could be easily and completely exhausted of alkaloids by simple percolation, and he suggested that such a tincture might be introduced in the British Pharmacopœia.

Mr. Ransom wished to add his testimony to what had been said in praise of the paper on the nitric acid process. He thought there was very little probability of powdered extracts replacing the old form of moist extract. If the powdered

extract is prepared from the standardized moist extract, it should not be forgotten that it could not contain the theoretical proportion of strychnine, as there is always a certain amount of alkaloid lost in drying.

Mr. KNIGHT said, with reference to standardization, the 1898 Pharmacopœia seemed to have been made in the interests of the wholesale druggists, and to drive into their hands largely the manufacture of galenicals. It was by no means an unmixed benefit. He had seen samples of Aqua Laurocerasi possessing neither aroma nor flavour, but which were to all intents and purposes standardized solutions of hydrocyanic acid. To push the matter as suggested, so that so much brucine and so much strychnine should be in Ext. Nucis Vom., it would be more consistent to reduce with sugar of milk and call it a trituration.

Messrs. BARCLAY, BOORNE and PROSPER MARSDEN having said a few words in appreciation of the authors' work.

Mr. WRIGHT, in replying on the discussion, referred in the first place to Mr. Dott's strong objection to the use of the drug as a diluent. He (the speaker) said the reason for its use was that it facilitated recognition. The microscopical characters of the drug were so characteristic that any one could easily recognize the extracts under the microscope. He agreed that it was difficult completely to exhaust a drug of its alkaloid, but it was easy to get out the greater part of the alkaloid; the difficulty was in the last traces, but that could be overcome. The use of the drug itself was also a matter of convenience, and in deciding to use it they looked at all the circumstances of the case. In regard to Mr. Alcock's remarks as to the removal of the fat, one could take out all the fats with paraffin. The process first received from across the water had been tried, and found reliable and satisfactory. Although one could not remove the whole of the fat from an alcoholic solution of nux vomica alkaloids in this way, he pointed out that, after distilling off the spirit, paraffin removes it, and also traces of a black resinoid substance. He next referred to the action of nitric acid on brucine. The chemical nature of the action was well understood, and he did not, of course, mean that strychnine was destroyed, but that it was converted into another compound—"di-nitro-brucine." As to the strychnine standard, he had hoped to have laid before them some information. Medical men agreed that brucine and strychnine had similar physiological action, but that brucine was weaker. He was awaiting informa-

tion on that point from Dr. Dixon. Falk gave brucine as $\frac{1}{40}$th of the strength of strychnine. Others gave a different proportion, even as low as one-seventh. Dr. Dixon, in a recently-published book, gave 1–30th, but he (the speaker) was inclined to think that figure had not been worked out by Dr. Dixon himself. The extracts kept very well in powdered form where the precaution was taken to have a large proportion of diluent to extract (at least two of diluent to one of dry extract). In some cases this might seem an insuperable difficulty; a proper ratio between diluent and extract was absolutely necessary. He had used the powdered extracts in his own business with great satisfaction. Answering Mr. Ransom as to whether soft extracts were likely to be replaced by the powdered products, he could only say that pharmacists were bound to find the powdered extracts more convenient, and he thought the moist extract would in time drop out of use.

SOME APPLICATIONS OF PHYSICAL CHEMISTRY TO PHARMACOLOGICAL PROBLEMS.

By T. Slater Price, D.Sc., Ph.D., F.I.C.

In this short paper I propose to refer to one or two cases in which physico-chemical methods have been applied with advantage to the investigation of pharmacological problems. At the outset I must claim the consideration of the Conference, because I myself am not a pharmacologist, and consequently am not *au fait* with all the most recent work which has been done in this branch of chemistry. The problems with which I shall deal have been worked out some years back, but well illustrate my subject.

We will consider the question of the toxic and disinfecting action of certain salts. This has been very carefully studied by Paul and Krönig in the case of mercury salts. The salts used were chiefly mercuric chloride, bromide and cyanide, the test being the poisonous action of solutions of these salts on the spores of the anthrax bacillus. The disinfective power of the solutions was determined by allowing them to act on approximately equal numbers of the spores. The poison was then destroyed by chemical means (e.g. precipitation of the mercury salt by means of ammonium sulphide), and the number of colonies which developed in agar-agar was determined. This

number could then be used as a measure of the poisonous effect of the solution; the more poisonous the solution the less the number of colonies.

In order to obtain comparative numbers equivalent solutions of the salts were used; the results are shown in the following table:—

Solution.	After treatment for 20 minutes there developed.	After treatment for 85 minutes there developed
1 Mol. $HgCl_2$ in 64 litres H_2O . .	7 Colonies	0 Colonies
1 Mol. $HgBr_2$ in 64 litres H_2O . .	34 Colonies	0 Colonies
1 Mol. $Hg(CN)_2$ in 16 litres H_2O .	8 Colonies	33 Colonies

The first conclusion we can draw from this table is that the toxic action increases with the times during which the solutions are allowed to act on the spores; this is what one would expect. The three salts are very different in their action, however, and mercuric cyanide, which one might expect to be the most poisonous of all, is the least poisonous. Why is this? The explanation can be given by making use of the theory of electrolytic dissociation. This theory can be expressed in a few words as follows; for further details I must refer members to recent books on theoretical chemistry: It is well known that if ammonium chloride is vaporized by heat, the vapour consists chiefly of molecules of NH_3 and HCl, and not of NH_4Cl molecules, as shown by the abnormal vapour density. The ammonium chloride is dissociated by heat. An analogous process takes place when a salt such as sodium chloride is dissolved in water. The solution does not contain solely molecules of NaCl, but a large proportion of these is split up into the component parts Na and Cl, which parts are called ions. These ions are quite different from the elements Na and Cl, as the solution neither smells of chlorine nor is the water decomposed by the Na. The difference is that the Na possesses a positive charge, and the Cl a negative charge, of electricity (the ions are consequently written Na+ and Cl–, or more often Na· and Cl′); this is instanced by the fact that if an electric current is passed through the solution the Na· ions, because of their positive charge, are attracted to the negative pole, the cathode, and there discharged, while the negative Cl′ ions are discharged at the positive pole, the anode. The process of splitting up which thus takes place

when the NaCl is dissolved in water is known as "Electrolytic Dissociation," to distinguish it from thermal dissociation (cf. NH_4Cl on heating, as above). All substances when dissolved in water do not dissociate; such a one is cane sugar. If there is no dissociation the solution will not conduct electricity. Consequently substances such as NaCl, which confer upon water the power of conducting the electric current, are termed *Electrolytes*; substances like cane sugar are *Non-electrolytes*. The evidence in favour of the theory of electrolytic dissociation is almost overwhelming, but cannot be given more fully now. In the last few years the theory has been somewhat modified by the assumption of the hydration of the ions, and also, in all probability, of the undissociated molecules. It should be further pointed out that the dissociation of the dissolved NaCl molecules into ions is not necessarily complete; it varies with the concentration of the solution, being greater the more dilute the solution. This is shown by the following table; the first column represents the number of Gm.-molecular weights of NaCl dissolved in 1 litre of water, and the second column the percentage dissociation :—

Molecular Concentration.	Per Cent. Dissociation.
0·200	86·5
0·171	87·1
0·169	88·7
0·150	94·2
0·127	97·4

Another point which should be borne in mind is, that if equivalent solutions of different electrolytes are not taken, the degrees of dissociation are not necessarily the same. In most cases they are different, i.e. the degree of dissociation is a specific property of each electrolyte.

We can now understand the results obtained by Paul and Krönig. Mercuric chloride when dissolved in water dissociates to some extent into $Hg^{\cdot\cdot}$ ions and Cl' ions, each molecule of $HgCl_2$ giving one $Hg^{\cdot\cdot}$ ion, and $2Cl'$ ions, so that the sum of the electric charges is zero, and the solution remains electrically neutral. Similarly $HgBr_2$ on dissociation gives $Hg^{\cdot\cdot}$ and $2Br'$, and $Hg(CN)_2$ gives $Hg^{\cdot\cdot}$ and $2(CN)'$. Now, if the toxic action of the salts is due to the $Hg^{\cdot\cdot}$ ions, we should expect that the salt which is dissociated to the greater extent would have the greater toxic effect. This, in fact, is found to be the case; $HgCl_2$ is more dissociated than $HgBr_2$, and its toxic action is

also greater; similarly with $Hg(CN)_2$. It is possible that the ions other than $Hg^{\cdot\cdot}$ may possess a toxic action, but in the present case their effect is negligible in comparison with that of the $Hg^{\cdot\cdot}$ ions, since the dissociation of the salts is very small. The effect of the undissociated molecules is also very slight, if, indeed, they exercise an influence at all.

Similar results were obtained with salts of silver, but as these are more highly dissociated than mercuric salts the effect of the negative ions (the acid ions) makes itself felt. This is shown by the following table :—

Solution.	Colones after. 60 minutes.
1 Mol. $AgNO_3$ in 20 litres H_2O	27
1 Mol. $AgClO_3$ in 20 litres H_2O	42
1 Mol. $AgClO_4$ in 20 litres H_2O	219
1 Mol. $AgCH_3COO$ in 20 litres H_2O	1580

All these salts are dissociated to approximately the same extent in equivalent solutions, and consequently the concentration of the $Ag^{\cdot}$ ions is the same in each case. The action of these salts is different in every case, and depends therefore on the acid ion as well as on the $Ag^{\cdot}$ ion; the NO_3' ion has the greatest toxic action, while the CH_3COO' ion has the least.

In the case of the mercuric salts it has been shown that their toxic effect is due to the $Hg^{\cdot\cdot}$ ions; it therefore follows that if the dissociation of the salt can be diminished, i.e. the concentration of the ions made less, the toxic effect will also be diminished. How can the dissociation be diminished? Without dealing with the theory of the process according to the law of mass action, the method used can be illustrated by reference to the action of sodium acetate on acetic acid. It is well known that if sodium acetate is added to acetic acid the acidity of the latter is diminished, and use is made of this fact in many qualitative and quantitative operations in chemical analysis. Now, all acids when dissolved in water are dissociated to a greater or lesser extent, the positive ion in all cases being $H^{\cdot}$. If equivalent solutions of different acids are compared, it is also found that the greater the dissociation of the acids, i.e. the greater the concentration of the $H^{\cdot}$ ions, the stronger is the acid. Thus HCl is a strong acid, because in solution it is largely dissociated into $H^{\cdot}$ and Cl' ions; on the other hand, CH_3COOH (acetic acid) is a weak acid, because it is only dissociated to a small extent into $H^{\cdot}$ and CH_3COO' ions. Thus, in an N/10 solution the dis-

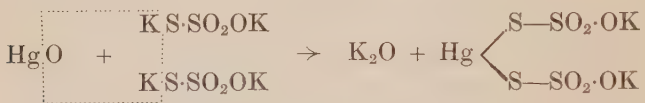
sociation of HCl is 92·4 per cent., while that of CH_3COOH is 4·11 per cent. On the other hand, if the Na salts of these acids are compared, it will be found that they are dissociated to practically the same extent in equivalent solutions. Now it is always found, and it can be predicted by theory, that if the Na salt of a weak acid is added to the solution of that acid, e.g. CH_3COONa to CH_3COOH, the dissociation of the acid is diminished, i.e. the acid becomes weaker. This is not the case if the Na salt of a strong acid is added to a solution of the acid, e.g. NaCl to HCl; the dissociation of the acid, and therefore its acidity is hardly affected. This can be generalized as follows: "If to the solution of a weakly dissociated substance a salt containing a common ion, and which is strongly dissociated in solution, is added, the dissociation of the former will be diminished." It has already been mentioned that $HgCl_2$ is only slightly dissociated, whereas NaCl is dissociated to a large extent. If, therefore, NaCl is added to a solution of $HgCl_2$, the dissociation of the latter, and consequently its toxic effect, should be diminished; also the more NaCl added, i.e. the greater the concentration of the common ion (Cl′) added, the more will the dissociation (and toxic effect) of the mercuric chloride be diminished. That this is so is shown by the following table, where the more NaCl added the greater is the number of colonies developed.

				Number of Colonies.
1 Mole. $HgCl_2$			dissolved in 16 litres H_2O .	8
1 „	„	+1 Mole. NaCl	„ „ „ .	32
1 „	„	+2 Mole. NaCl	„ „ „ .	124
1 „	„	+3 Mole. NaCl	„ „ „ .	282
1 „	„	+4 Mole. NaCl	„ „ „ .	382
1 „	„	+4·6 Mole. NaCl	„ „ „ .	410
1 „	„	+6 Mole. NaCl	„ „ „ .	803
1 „	„	+10 Mole. NaCl	„ „ „ .	1087

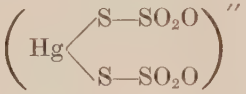
This result is of interest, because in medical practice solutions of mercuric chloride are often used as a disinfectant, and it is customary to increase the solubility of the mercuric chloride by adding sodium chloride to it. Thus, in Germany, the $HgCl_2$ and NaCl are mixed in equal proportions by weight, i.e. approximately the proportion $HgCl_2 + 4·6$ NaCl, and the above table shows how the disinfecting power of the mercuric chloride is thereby diminished. In this respect, however, it should be pointed out that this diminution of the dissociation becomes

less as the dilution increases. Thus, if the $HgCl_2 + 4{\cdot}6$ NaCl are dissolved in 256 litres (approximately a 0·1 per cent. solution, as used in practice) the influence of the NaCl is almost, though not quite, done away with. If the proportion of NaCl be increased, however, it will have an effect, even in dilute solution.

There is still another way in which $Hg^{\cdot\cdot}$ ions may be removed, and the toxic effect of the salts taken away. This is by the formation of complex salts.[1] Yellow mercuric oxide dissolves in potassium thiosulphate ($K_2S_2O_3$) with the formation of mercuric thiosulphate, according to the equation—



This latter salt dissociates into the ions



and $2K^{\cdot}$, so that the solution contains no $Hg^{\cdot\cdot}$ ions, and should therefore be non-toxic, as is indeed found to be the case. Similarly, the toxic effect of silver salts can be reduced by the addition of sodium thiosulphate; the $Ag^{\cdot}$ ion combines with the thiosulphate ions (S_2O_3) to form the complex ion AgS_2O_3', which is non-toxic.

From the foregoing results it is evident that, in order to estimate the toxic effect of salt solutions, it is not enough to determine merely the total concentration of the dissolved substance, but it is also necessary to find the concentration of the ions. This is also true when effects other than toxic are being studied. It must not be supposed, however, that the question is always as simple as given above; complications very often occur, and these will only be explained as our knowledge increases.

Another application of physical chemistry in a totally different direction has been the investigation of the reason why chloroform made from acetone is not nearly so good an anæsthetic as chloroform made from ordinary alcohol (see Wade and Finne-

[1] Complex salts must be distinguished from double salts. Thus, $KAg(CN)_2$ (*not* $KCN{\cdot}AgCN$) is a complex salt, but $Al_2(SO_4)_3,K_2SO_4,24H_2O$ is a double salt. For an explanation of the essential difference reference must be made to works on physical chemistry.

more, *Journ. Chem. Soc.*, 85, 938, 1904); this was shown to be due to the presence of a very small proportion of ethyl chloride in the latter. Numerous other examples could be given, but I think that I have now brought before the members of the Conference enough to show that a knowledge of physical chemistry may be of great use to pharmacologists.

The PRESIDENT thanked the author for his paper. In the absence of Dr. Price, there was no discussion.

NOTE ON STROPHANTHUS AND STROPHANTHIN.

By E. W. MANN.

Ten years ago the late Mr. John Barclay (*Pharm. Journ.*, November 28, 1896) described a method for the assay of tincture of strophanthus based upon the determination of the strophanthidin yielded by the hydrolysis of the strophanthin present. This method he, at a later date, extended to the extract introduced by the compilers of the 1898 Pharmacopœia. The process was expeditious, and gave concordant results under similar conditions, and, indeed, as recently as September, 1905, Cæsar and Loretz have published a method the essential principle of which is identically the same, but which is vitiated by the introduction of hydrogen sulphide to remove excess of lead salts, Fraser (*Pharm. Journ.*, July 23, 1887) having shown that the presence of this compound is sufficient to cause more or less decomposition of the strophanthin. The writer of this note, however, well remembers that Mr. Barclay would have preferred a method involving direct determination of the active principle, and not of a decomposition product, since, in addition to other objections, there was a possibility that the evaporation of an aqueous solution of strophanthin in contact with the organic acids of the seeds might result in partial hydrolysis. It was also felt, in view of later work, that, unless the seeds used in the preparation of the tincture had been accurately verified, the determination of strophanthidin would afford no criterion of the therapeutical value of the tincture.

The experiments of which this note forms a report were undertaken with the above object, and although it is to be regretted that the results are, to a certain extent, of a negative character, it is hoped that they will not be without value.

Four specimens of seeds were taken; they were:—

1. Seeds from a commercial parcel, origin unknown, but with 100 per cent. giving a green reaction with 80 per cent. sulphuric acid.

2. Seeds of *Strophanthus Kombé*, "Mandala brand," 100 per cent. giving green reaction.

3. Seeds of *Strophanthus Nicholsoni*, described by E. M. Holmes (*Pharm. Journ.*, September 4, 1897) and kindly verified by him. These seeds gave a distinct red reaction with the acid test.

4. Seeds of *Strophanthus gratus*, which were guaranteed authentic, and gave a yellowish pink colour with the above reagent.

The method of examination was as follows: 100 Gm. of the seeds was powdered and exhausted with petroleum spirit; the oil was separated and incidentally examined on the usual lines. The oil-free powder was air-dried, transferred to a Dreschel extractor, and percolated for thirty hours with boiling absolute alcohol; percolate was evaporated and the residue, when cold, taken up with water. To this aqueous liquid a slight excess of solution of basic acetate of lead was added, the liquid filtered, filtrate treated with excess of sodium sulphate, filtered, filtrate evaporated at low temperature with 10 Gm. of fine sand. The product was powdered and exhausted in a Soxhlet tube with boiling amyl alcohol; the bulk of the solvent was removed on a water-bath and evaporation and drying completed at 60°C.[1]

The characters of the oils are subjoined, and do not exhibit any marked variation:—

	S. Kombé (?).	*S. Kombé. Mandala.*	*S. Nicholsoni.*	*S. gratus.*
Percentage of oil in seeds	34·08	34·76	29·90	35·01
Specific gravity of oil .	0·9249	0·9278	0·9219	0·9230
Free acid calculated as oleic, per cent. . .	7·55	6·84	14·84	5·17
Saponification number .	192·6	189·7	190·5	191·3
Iodine absorbed in 18 hours, per cent. . .	100·7	99·4	99·7	93·3
Melting-point of fatty acids	33° C.	33° C.	33° C.	29° C.

[1] The small amount of mineral matter present may be determined and deducted.

The strophanthin obtained by the method described was in each case crystalline, slightly reddish in colour, and highly deliquescent; recrystallized from amylic alcohol, long colourless needle crystals were obtained, which gave highly characteristic colour reactions with sulphuric acid. Each specimen of strophanthin proved to be very slightly dextro-rotatory in alcoholic solution, while in no case could a sharp melting-point be obtained for the anhydrous glucoside. The results obtained from this examination are as follows :—

—	*S. Kombé.*	*S. Kombé. Mandala.*	*S. Nicholsoni.*	*S. Gratus.*
Strophanthin, per cent. .	7·27	6·87	3·69	7·76
Colour reaction of strophanthin with 80 per cent. sulphuric acid .	deep green	deep green	brown	brown
Strophanthin per cent. as determined by the strophanthidin method	9·36	8·92	7·36	3·88

These latter figures in the cases of *S. Nicholsoni* and *S. gratus* exhibit such marked variation from those obtained by the direct method as to suggest that some essential difference exists in the chemical composition of the different glucosides; and, in view of the recommendation of Thoms and others (*Pharm. Journ.*, April 30, 1904), that *S. gratus* should be recognized as the German official source of strophanthus, the point is one of considerable importance. This peculiarity of behaviour is also marked when the results of testing physiologically are considered.

These physiological tests were kindly undertaken by Professor R. F. C. Leith, M.A., M.B., F.R.C.P., of Birmingham University, and for this purpose crystallized specimens of strophanthin were prepared by the above method from three of the varieties of seeds examined. The strophanthin was made up into a solution in 70 per cent. alcohol, representing 0·2 Gm. of the glucoside in 100 mils, the strength being fixed at this in order to approximately represent the tincture in strength as assayed by the strophanthidin method.

Professor Leith conducted his experiments upon frogs, and his results are outlined below, the different strophanthins being distinguished, according to Arnaud's suggestion, by the initial letter of their specific names.

Using solutions of the above strength, and diluting the dose before injection with normal saline, it was found that N-strophanthin in doses of $\frac{1}{4}$ and $\frac{3}{4}$ minim produced no effect; 1 minim produced a quickened respiration, and $1\frac{1}{2}$ minims injected into a fourth frog also caused some quickening of respiration; but all the frogs were alive and apparently well some weeks after the injection.

Using K-strophanthin, no apparent effect was produced by $\frac{1}{4}$ minim dose; $\frac{3}{4}$ minim produced rapid breathing, whilst 1 minim caused signs of illness; $1\frac{1}{2}$ minims, however, was sufficient to cause death within an hour.

G-strophanthin, as before, caused no apparent illness in $\frac{1}{4}$ and $\frac{3}{4}$ minim doses, but a 1 minim dose sufficed to kill a large and active frog within three hours; whilst $1\frac{1}{2}$ minims destroyed life in a similar specimen within sixty-five minutes.

The minimum lethal dose per 100 Gm. of frog is therefore as follows:—N-strophanthin, not within the limits of the experiments; K-strophanthin, 5 minims; G-strophanthin, 3·8 minims. Continental workers have testified to the activity of G-strophanthin, and these results bear out their opinions. K-strophanthin is not far removed in its toxicity, whilst the Nicholsoni glucoside is comparatively feeble, or even inert.

Considering the whole question, these results appear to show that it is possible to chemically standardize strophanthus and its preparations, but that the standardization can only have a real value when the botanical character of the seeds is fully established, and, failing this, the activity of the drug can only be tested by physiological experiments, and even here we are confronted by the fact that the active glucoside in *Strophanthus gratus* exhibits decided variation from that present in the official variety, and may not be strictly comparable in its physiological effects upon human beings.

Further investigations are being carried on in the laboratories of Messrs. Southall Brothers & Barclay, Limited, with a view to establishing the chemical differences, if any, between the various glucosides, and I hope to be able to communicate more definite results to a future meeting of this Conference.

The PRESIDENT asked if the author was satisfied that there was not a considerable loss of strophanthin by the process adopted. It seemed to him that particularly in the process of

washing there was bound to be a loss. Had the author made control experiments ?

Mr. Gerrard said he had followed with especial interest the attempt to obtain pure strophanthin. He (Mr. Gerrard) had made many attempts, but had never been satisfied that the product was absolutely pure. By the use of sodium sulphate to remove lead, sodium acetate was formed, which was very soluble in most of the solvents. Had Mr. Mann succeeded in getting rid of the sodium acetate ? Glucose was also difficult to remove entirely, and he wondered whether the strophanthin obtained was quite free from glucose. He thought the percentages obtained were considerable, and larger than he should have expected. He wondered whether the strophanthin was pure, but if crystalline strophanthin could be put on the market that would be conclusive. In conclusion, he congratulated the author, and hoped they would hear more from him on this subject.

Mr. Wright corroborated what had been said as to the difficulty of ensuring a pure product. He had found that the process adopted by the late Mr. John Barclay was the most satisfactory he knew ; it produced fairly constant results, but he had never succeeded in getting a pure product.

Mr. Umney asked Mr. Mann whether he had any experience of the relative activity of seeds giving the red and green reactions with sulphuric acid. He asked the question because he had taken seeds giving the two reactions from the same pod, and only those giving the green reaction were official. Was the reaction due to different degrees of maturity of the two seeds, or to some other cause ?

Mr. Mann, replying on the discussion, said precipitates were washed until bitterness was removed ; the resulting product was in each case incinerated and ash deducted ; on recrystallization, crystals as long as one to two inches were obtained, quite colourless and free from mineral impurity. It was also improbable that any glucose would be present. No experiments had been made with specimens of strophanthus, the seeds of which gave varied colour reactions with sulphuric acid.

NOTES ON THE FLORA OF THE LICKEY HILLS.

By John Humphreys, F.L.S.

The county of Worcester has been well described as shaped

like a vine-leaf, with the Severn forming the mid-rib, and the Avon and Teme representing the lateral veins.

In the east the Lickey and Clent Hills are conspicuous landmarks, giving rise on the north side to the Rea, Stour and Arrow, while the south is drained by various streams which ultimately unite just below Bromsgrove, into the Salwarpe, which flows into the Severn at Hawford, half-a-dozen miles above Worcester. The Lickey Hill is the stump of probably one of the oldest mountain ranges in the world, compared to which the Alps and Himalayas are mushrooms of yesterday.

Near Barnet Green Station is an exposure of Archean rocks, the oldest of the sedimentary formations, which appears to be absolutely destitute of fossils, dating back to the very dawn of geological history; while the main core of the hill is formed of Cambrian quartzite, of which good sections may be seen in several quarries on the hillsides, showing the strata folded and contorted by lateral pressure.

Near the summit, at Kendal End, is a small exposure of Silurian rocks, the Woolhope limestone, which has been worked until recently; and, crossing over the ridge to Rubery, about a mile distant, we see one of the most interesting sections in the Midlands.

Opposite the gates of the asylum the Cambrian quartzite is overlaid with Llandovery rocks, the lowest of the Silurian measures, consisting of a rich, red, coarse sandstone, filled with casts of Pentamerus, and we can actually observe the effect of the grinding down of the quartzite rocks and their re-deposit on the shore line of this the Llandovery Sea.

In the asylum grounds the Woolhope limestone reappears, rich in fossil invertebrate life, but the measures are largely concealed by the overlying carboniferous sandstone.

The upper Lickey slopes and the adjoining Clent Hill are covered with angular red rocks of Permian Breccia, supposed to have been formed by the disintegration into screes of ancient local mountains; while the south-west sides are formed of the lowest division of the new red sandstone, deposited in a fresh-water lake, represented by the Bunter sandstone, of a beautiful chocolate red colour, of which a good section may be seen at Blackwell Station; and the Bunter pebble beds, which extend nearly to Bromsgrove, and, in some places, are 400 ft. in thickness, exhibiting masses of pebbles, some of immense size, brought down by mighty rivers in the distant past.

At Bromsgrove the Bunter beds are overlaid with Keuper sandstone, of a white or dull red colour, used locally for building purposes, and the town and district are situated in a basin of Keuper rocks.

Passing from the town either to the south-east or west, about a mile distant, one climbs over the rim of the basin and descends on to a plain of red marl, which covers the country for miles around, completely burying the Keuper sandstone; and it is in the lower measures of the Keuper marl that the brine springs exist, from which salt is extracted at Stoke and Droitwich.

In the west, towards Bentley and Hanbury, the Triassic measures are overlaid by the calcareous rocks of the Lias, which extend over the country in the south and west. Lastly, the whole face of the landscape is covered by a deposit of glacial drift, which in some places is of considerable depth. At Blackwell, near the summit of the Lickey, is an extensive bed of glacial till or mud 20 ft. in thickness, and a similar section at California, near Harborne, measures 50 ft., formed of mud from sub-glacial streams, and full of fragments of rocks scraped by the Arenig glacier in its progress eastwards from the Welsh hills; coal from South Staffordshire, Rowley rag from Rowley Hill, quartzite and Llandovery rocks from the Lickey, all mixed together, like plums in a pudding, polished and scratched and scored, telling most eloquently the story of England's submergence under the great ice cap in late geological time.

Scattered over the hills are large numbers of boulders brought by the glacier from the Arenig mountain, at the back of Bala. Some are of great size; a pair near Illey are supposed to weigh 16 tons each. They are composed of felsite, and often exhibit all the signs of polishing and grooving indicative of ice-carried rocks, and are strewn over the country, occupying a space of 12 sq. miles, suggesting the enormous extent of the glacier, which, starting from the Welsh mountains, impelled ever forwards by the accumulating ice cap which buried the Snowdonian ranges, traversed the low plains of Cheshire, Shropshire and Staffordshire, crossed the Severn valley near Bridgnorth, and climbed the Clent and Lickey Hills, terminating in the neighbourhood of Birmingham.

At Romsley Hill, 960 ft. above sea-level, three large boulders may be seen, left by the ultimate melting of the glacier; and the summit of Rubery Hill is occupied with similar blocks at an elevation of 800 ft.

Probably no place in England exhibits a more diversified geological aspect.

Originally Worcestershire was more or less occupied by enormous forests. Feckenham Forest covered the whole of the north-east of the county, extending from the Forest of Arden to the City of Worcester, and was the Royal forest, held by the King for hunting purposes. In the south-east was the Forest of Horewell, while the country at the west of the Severn was overgrown by the Forest of Wyre and Malvern Chase.

The rivers were the principal highways by which the forests were penetrated and communication made from hamlet to hamlet.

At the time of the Domesday Survey the Manor of Bromsgrove, which included the Lickey Hills and all the country stretching from Birmingham in the north to Upton Warren in the south, fell to the share of the Conqueror, and was kept very largely as a hunting lodge, for we are told that he bred his hawks for hunting on the Manor.

The forests were ultimately done away with in the year 1629, and the land brought into cultivation, but a great amount of common and waste land existed until the end of the eighteenth century.

This was especially the case with the Lickey, where the more elevated portion was a wild heath, growing bracken and heather and ling. A considerable amount also consisted of bog and marsh, the home of many rare plants, many of which have ceased to exist. About the year 1800 from two to three thousand acres of land were enclosed on the Lickey, at an expense of about £8 per acre, and the land brought into cultivation; and during recent years the Lickey slopes have been covered with large houses and mansions, converting it into a fashionable suburb of Birmingham.

Land has enhanced in value accordingly, and the commons, which a century ago were worth £8 an acre, are converted into building sites, valued at £300 an acre.

At the present time there is but little unenclosed land in the north-east of the county. Most of the marshy localities have been thoroughly drained, and the rarer plants are met with but seldom, but still sufficient remain to testify to its former botanical luxuriance and to indicate the varied character of the geological strata.

The first recorded observations of the flora of East Worcester-

shire were made by Mr. Purton, a surgeon, of Alcester, who published in the year 1817 *The Midland Flora*. He visited the Lickey from time to time, and mentions many rare bog plants which then flourished, among them being the sundew, marsh cinquefoil and grass of Parnassus. All are now extinct, but the sundew existed until quite recently. Mr. Carpenter, who resided at Chadwich Manor at the beginning of last century, when the commons were enclosed, mentions the cranberry, bog asphodel, and bog violet as common plants.

A few marshy spots still remain, the home of the marsh violet, *Viola palustris* ; bog pimpernel, *Anagallis tenella* ; and bog bean, *Menyanthes trifoliata* ; and the streamlets which meander down the Lickey slopes are fringed with ivy-leaved ranunculus, *Ranunculus hederaceus*, and water blinks, *Montia fontana* ; and at Wildmoor the brook is coloured golden in July with yellow mimulus, *Mimulus luteus*, which here finds a congenial home, growing in great luxuriance.

In the woods on the Lickey summit may be found the great horsetail, *Equisetum maximum*, growing in gigantic masses in company with the marsh horsetail, *Equisetum palustre*, and in spinneys on the coal measures near Rubery the fairy-like form of the wood horsetail, *Equisetum sylvaticum*, is quite common, but it is absolutely local, never straying beyond the coal measures, and it is an interesting fact that the coal measures are often formed of ancient equisetums, their modern but little changed representatives growing on the soil above them.

On the quartzite rocks at Rubery two plants are quite local—the elegant climbing fumitory, *Corydalis claviculata*, and red spurry, *Spergularia rubra*, and in damp meadows adjoining the beautiful water avens, *Geum rivale*, may also be found.

In the more elevated fields on the southern slopes the rare fern, the moonwort, *Botrychium lunaria*, grows sparingly, and in the same locality may be seen the adder's tongue fern, *Ophioglossum vulgatum*, in company with the singular green frog orchis, *Habenaria viridis* ; dwarf variety of milkwort, *Polygala depressa* ; mountain speedwell, *Veronica montana* ; and long-stalked cranesbill, *Geranium columbinum*. In dark ravines in the woods several rare ferns flourish, and a sight may be witnessed equal to any famed Devonshire combe in the luxuriant growth of lady fern, *Athyrium filix-fœmina* ; broad buckler, *Lastrea dilatata* ; spinulose buckler, *Lastrea spinulosa* ; the rare mountain buckler, *Lastrea oreopteris*, male fern, *Lastrea filix-*

mas; prickly shield fern, *Polystichum aculeatum*; soft shield fern, *Polystichum angulare*; hart's tongue, *Scolopendrium vulgare*; and hard fern, *Blechnum boreale*; and in the same locality the singular parasite, the toothwort, *Lathra squamaria*, is occasionally seen growing on the roots of the hazel.

At Bittell Reservoir, situated in a hollow on the east of the hills, many interesting plants exist. Among them are the bitter cardamine, *Cardamine amara*; flowering rush, *Butomus umbellatus*; arrowhead, *Sagittaria sagittifolia*; amphibious cress, *Nasturtium amphibium*; creeping loosestrife, *Lysimachia nummularia*; marsh speedwell, *Veronica scutellata*; and greater skull cap, *Scutellaria galericulata*. Among the truly aquatic plants may be noticed peltate-leaved water crowfoot, *Ranunculus peltatus*; Baudot's crowfoot, *Ranunculus Baudotii*; circinate crowfoot, *Ranunculus circinatus*; the fennel-leaved, curled and perfoliate varieties of pond-weed, *Potamogeton pectinatus*, *crispus* and *perfoliatus*; and in September, when the water is low, mudwort, *Limosella aquatica*, and shore-weed, *Littorella aquatica*, cover the muddy shores.

In woods adjoining, the beautiful narrow-leaved helleborine, *Cephalanthera ensifolia*, and wood helleborine, *Epipactis media*, may occasionally be met with, and the elegant spreading bell-flower, *Campanula patula*, and nettle-leaved bell-flower, *Campanula trachelium*. In meadows not far distant the singular and rare fritillary, *Fritillaria meleagris*, grows sparingly, a plant most uncommon away from calcareous soil.

Near Tardebigge, elecampane, *Inula Helenium*, has been seen.

Tardebigge Reservoir is the home of many rare plants, such as: Slender bird's-foot trefoil, *Lotus tenuis*; bur marigold, *Bidens tripartita*; giant bell-flower, *Campanula latifolia* (white variety); grass vetch, *Lathyrus nissolia*; perfoliate yellow wort, *Chlora perfoliata*; small-flowered gentian, *Gentiana amarella*; marsh wound-wort, *Stachys palustris*; arrowhead, *Sagittaria sagittifolia*; flowering rush, *Butomus umbellatus*; narrow-leaved water parsnip, *Sium angustifolium*; bee orchis, *Ophrys apifera*; the extremely rare ladies' tresses orchis, *Spiranthes autumnalis*; and butterfly orchis, *Habenaria bifolia*.

Here, too, in early spring, the stalked variety of primrose is sometimes seen, and herb Paris, *Paris quadrifolia*, a by no means common plant, and the meadows are a blaze of colour with the blossoms of the green-winged orchis, *Orchis morio*.

Creeping loosestrife carpets the inner bank of the reservoir

with its golden blossoms. Water plants are also represented by the narrow-leaved reed mace, *Typha angustifolia*, many varieties of the pond weed and amphibious persicaria, *Polygonum amphibium*, which fringes the waterside with its dense growth.

There are many other plants which are by no means common growing here and in the immediate vicinity, such as bitter cardamine, *Cardamine amara*; narrow-leaved pepperwort, *Lepidium ruderale*, a salt marsh plant, the seeds of which have been probably introduced by passing canal boats; hairy violet, *Viola hirta*, a lime-loving flower, and extremely local, all three mallows, musk, common and dwarf varieties, *Malva moschata*, *sylvestris* and *rotundifolia*; orpine, *Sedum telephium*; common skullcap, *Scutellaria galericulata* and *S. minor*; gipsywort, *Lycopus Europæus*.

At Hewell Grange the sweet sedge, *Acorus calamus*, fringes the lake border, a rather uncommon plant, which emits a delicious cinnamon-like smell when its leaves are bruised, and wild verbena, or vervain, *Verbena officinalis*, occurs near farmhouses in the district, and hoary potentilla, *Potentilla argentea*, on the sandstone rocks near Finstall. On the Lickey Hill I have never seen a plant of hemlock, *Conium maculatum*, though below Bromsgrove, on the banks of the Salwarpe, it is abundant; yet it never travels over the ridge of the red marl. The same remark may be made of the meadow cranesbill, which occurs frequently near Droitwich. The great hedge bedstraw, *Galium mollugo*, and many of the umbellifers, are absent from the Lickey, though common features of the red marl.

As an illustration of the limited and local growth of a plant, I may mention golden rod, *Solidago virga-aurea*, which made its appearance a few years ago near Barnet Green Station, and has now travelled along the railway embankment to Blackwell, and will doubtless spread over the district.

Other Lickey plants include: Bladder campion, *Silene inflata*; golden saxifrage, both varieties, *Chrysosplenium oppositifolium* and *alternifolium*; trailing St. John's wort, *Hypericum humifusum*; shining cranesbill, *Geranium lucidum*; buckthorn, *Rhamnus catharticus* (rare); moschatel, *Adoxa moschatellina*; meadow saxifrage, *Saxifraga granulata*; and meadow saffron, *Colchicum autumnale*. The limited time at my disposal prevents other than a hurried sketch of the more interesting Lickey plants, but I trust sufficient has been done to show that in spite of recent changes, the flora still retains features which will well repay the attention of the botanist.

The PRESIDENT said they were fortunate to have this matter placed before them in such a charming manner.

Mr. WHITE (Bristol) also congratulated the author on the felicity with which the paper had been presented.

Mr. DRUCE observed that the striking feature of the paper to him was the marked difference in the vegetation in places where the calcareous element was practically absent. A very interesting point was that referring to the *Limosella*, which had been brought under his notice recently in a curious way. He described an instance which gave an idea of the pertinacity of a small plant in holding its own, and also how dangerous it was to say a plant was extinct even in a well-worn locality. The growth of building operations in that neighbourhood had threatened those parts used by local botanists with destruction. With all the public spirit of Birmingham, he did wish some of that public spirit would find an outlet in respect of Sutton Park being kept unsullied by building operations, so that, at any rate, a park might be kept for all time in its natural condition. The present workers of Birmingham would do a great and good work for those who were to follow after them if they applied their energies in that direction.

Mr. HUMPHREYS, in replying, thanked those present for the kind reception accorded his paper, and Mr. Druce for his thoughtful observations. Time had only permitted him to give the slightest glance at the more remarkable plants.

NOTE ON UNGUENTUM COCAINÆ, P.B.

By R. A. CRIPPS, F.I.C.

In the summer of 1904 I had occasion to examine four samples of cocaine ointment taken under the Sale of Food and Drugs Acts. Two of the samples had been prepared with hydrochloride of cocaine instead of the alkaloid, and in each case there was a serious deficiency in the proportion of cocaine. This latter fact led me to suspect that some decomposition had occurred during the week which elapsed since the samples had been taken. The samples were therefore set aside with a view to future examination, which, however, I was unable to complete till about twelve months later. The following are the results obtained :—

No of Sample.	Cocaine Hydrochloride, 1904.	Cocaine Hydrochloride, 1905.	Cocaine, 1904.	Cocaine, 1905.
1	3·92 per cent.	3·2 per cent.	—	—
2	—	—	3·16 per cent.	0·2 per cent.
3	3·44 per cent.	1·9 per cent.	—	—
4	—	—	3·44 per cent.	0·15 per cent.

By these results two facts of great importance to the physician and pharmacist (not to mention the patient) are indicated, viz.—

1st. The unstable nature of this ointment.

2nd. The great superiority of hydrochloride of cocaine as regards permanence.

It may be objected that, cocaine hydrochloride being insoluble in lard, the ointment prepared from it will be less efficacious; but, in view of the fact that it is almost exclusively applied to mucous surfaces, this objection does not apply; on the contrary, the natural moisture of the membranes is sufficient to dissolve the salt, and so ensure the fullest effect; or, if hydrous wool fat be used in place of lard, the water of this base will answer the same purpose.

I suggest the following improved formula—

Ung. Cocainæ Hydrochloridi.

Cocaine Hydrochloride . . .	35 grains, or 4 grammes
Hydrous Wool Fat	840 ,, ,, 96 ,,

Reduce the cocaine hydrochloride to fine powder and mix thoroughly with the hydrous wool fat.

The President said it seemed to him that the question depended on whether pharmacological or physiological experiments were made. Was the author sure that the same physiological effects would be obtained from the pure alkaloid as from the hydrochloride?

Mr. Wright, who had had personal experience with regard to this question, said he had submitted the difficulty to a medical friend for expert opinion. His friend had told him that his experience was that where rapid action was wanted it was preferable to use cocaine hydrochloride. He (Mr. Wright) thought that hydrous wool-fat was a sticky base to use, and suggested that wool-fat and lard would make a softer ointment.

Mr. Umney asked to what Mr. Cripps attributed the decom-

position. Was it an acid in the lard ? If so, could the difficulty be surmounted by the addition of a little potassium bicarbonate to the lard ?

Mr. Peck called attention to the statement made by the author that " the natural moisture of the membrane is sufficient to dissolve the salt." Some time ago he had prepared a bougie containing two grains of cocaine hydrochloride made up with cacao butter ; the medical practitioner who had prescribed it said it had no effect whatever. He therefore prepared a bougie with two grains of the pure alkaloid dissolved in cacao butter, which the practitioner found had excellent results.

Dr. Symes said in the early days when cocaine was in its infancy it was customary to use the pure alkaloid, adding just sufficient acid to dissolve it. It had been noticed that if the cocaine were rendered very acid, its activity was reduced. His own opinion was that if the ointment could be rendered stable, it was best prepared with the alkaloid. With reference to the suggestion that lard should be added to the wool-fat in the formula proposed by Mr. Cripps, he submitted that it might be preferable to substitute paraffin for lard.

Mr. J. P. Gilmour mentioned a case of hospital clinical practice, where the method was to paint the parts with a solution of sodium bicarbonate previous to applying the solution of cocaine. In this way a better and more speedy result was obtained.

Mr. Cripps, in replying on the discussion, said opinions seemed to be equally divided. Perhaps it might be well to include two ointments in the British Pharmacopœia, one made with the pure alkaloid and the other with the cocaine hydrochloride. With reference to Mr. Umney's remarks on the acidity of lard, he pointed out that the Pharmacopœia ordered the cocaine to be dissolved in oleic acid.

THE EMULSIFICATION OF AQUEOUS LIQUIDS WITH THEOBROMA OIL IN THE PREPARATION OF SUPPOSITORIES.

By S. Taylor.

Amongst the subjects for investigation mentioned in the Research List of the British Pharmaceutical Conference is one

requiring "a method of emulsifying aqueous liquids with theobroma oil in the preparation of suppositories."

This note is to bring before your attention one method of emulsification, in the hope that other people's experience may be forthcoming. It is, of course, necessary that any method to be suitable must be such as can be worked extemporaneously at the dispensing counter.

This condition I have generally found is fulfilled by the addition of 1 or 2 per cent. of sodium stearate to the whole mass. This quantity does not materially alter the melting point of the oil of theobroma, and admits of the emulsification of 30 per cent. of water or watery liquid; indeed, given a suitable manipulation, 30 per cent. of a 45 per cent. spirituous extract, such as liquid extract of witch-hazel, may be incorporated with the cacao butter.

I have found one-third to be about the limit of liquid which cacao butter will "take up," as any quantity appreciably more than this makes the mass crumbly and unsuitable for moulding into suppositories. The method of manipulation varies with the liquid, and is not the same for such a preparation as spirit of hazel as it is for solution of adrenaline, which is decomposed by strong heat.

In the case of a liquid which may be boiled without injury, the liquid and the sodium stearate may be boiled together first, and then allowed to cool down. Then the oil of theobroma is added, and the whole stirred until emulsification is complete. This will not take place until the whole is ready to pour into the moulds.

In the case of liquids injured by strong heat, the sodium stearate and cacao butter may be heated together until completely mixed, and as the mass cools down the liquid may be stirred in to emulsify. This latter process is the more tedious.

It is, of course, impossible to lay down any hard-and-fast rule for making this class of suppository, and in many cases judgment and experience must point out the way. An instance of this is the case of hamamelin in the presence of excess of water, which tends to make it clot and form an unsightly as well as an eminently unsatisfactory mass. Here it would be preferable to first make the emulsion of liquid and oil, and then make the suppository by pressure in the cold.

In some cases of difficulty the addition of a small percentage of anhydrous wool fat is of advantage.

The accompanying list shows some formulæ which have been found to work with satisfaction, and gives some idea of the use of sodium stearate as an emulsifying agent—

Cacao Butter	64	66	66	69	48	68	60	72
Sodium Stearate	4	4	2	1	2	2	2	2
Anhydrous Wool Fat	2	—	2	—	—	—	—	—
Spirit of Hazel	30	30	30	30	30	—	30	—
Oxide of Zinc	—	—	—	—	12	—	—	—
Hamamelin	—	—	—	—	8	—	8	6
Liquid Extract of Hamamelis .	—	—	—	—	—	30	—	—
Solution of Adrenalin . . .	—	—	—	—	—	—	—	20

The PRESIDENT said this was an eminently practical paper and one of the kind which they wanted to encourage at Conference meetings.

Mr. ALCOCK said sodium stearate had been known for some years as a useful substance for solidifying liquids, and was especially useful for solidifying glycerin. Had the author been present he should have asked him if sodium stearate was available for solidifying liquid paraffin.

Mr. DOTT had found that Adeps Lanæ, with a little white wax, was useful for the purpose of incorporating certain substances with cacao butter.

Mr. J. R. HILL said this was a typical example of the kind of paper wanted by the Conference; it was not of the "wholesale" character to which they had become accustomed. He congratulated the author on the most valuable suggestion he had made as to dealing with a difficulty which was frequently met with at the dispensing counter. The suggestion of Mr. Dott was often acted upon, and was a most useful one. Adeps Lanæ with a little wax, however, would not take up the same quantity as would sodium stearate with the same good results.

Mr. GERRARD said he had had a large experience in the emulsification of extracts with cacao butter. He found that if the extract was thinned to a cream, and the cacao butter melted and mixed with the extract, with considerable manipulation a soft paste was obtained, which could be rolled by the hand into a cylinder, cut into pieces, dusted over with a powder, and then forced into the mould with the thumb. In this way, with a little practice, suppositories could be rapidly turned out.

REVIEW OF PAST ANALYSES OF DRUGS OFFICIALLY BOUGHT IN BIRMINGHAM.

By J. F. Liverseege, F.I.C., Ph.C.

Samples of drugs are bought for analysis in Birmingham not only from qualified chemists, but also from drug companies herbalists and hucksters. It must not be assumed, therefore, that all the adulterated samples mentioned below were obtained from qualified pharmacists. In fact, the worst of the samples have been obtained from shops kept by unqualified persons.

Arrowroot.

Over 200 samples have been analysed and only two were adulterated : one consisted of tous-les-mois starch and the other of maize starch. The ash of arrowroot is generally about 0·15 per cent., the extremes have been 0·08 per cent. and 0·26 per cent. Two genuine samples contained 0·01 per cent. and 0·02 per cent. of nitrogen, while the maize contained 0·07 per cent.

Borax.

The following is the method of analysis used :—

1. Dissolve 2 Gm. in about 50 mils of water, add methyl orange and titrate with N/2 HCl. The result multiplied by 25 gives the number of mils of normal acid required by 100 Gm. of borax (=M). The equation for the reaction is—

$$Na_2B_4O_7, 10H_2O + 2HCl = H_2B_4O_7 + 2NaCl + 10H_2O$$

2. Dissolve 1 Gm. of borax in about 25 mils of water, add phenolphthalein, 25 mils of glycerin, and 10 mils (or more if necessary) of N/2, NaHO, and titrate back with N/2 HCl. The quantity of acid used is subtracted from the soda, and the difference multiplied by 30 gives the number of mils of normal alkali required by 100 Gm. of borax (= P). The equation is—

$$Na_2B_4O_7, 10H_2O + 2NaHO = 4NaBO_2 + 11H_2O$$

When borax only is present these two quantities, M and P, will be approximately equal, and the percentage of borax present may be obtained by multiplying either by 0·1908, where oxygen equals 16. For example, the value 526 was obtained for M, and 524 for P. The corresponding percentages of borax were 100·4 and 100·0.

Most of the samples analysed have given figures similar to the above and have been genuine. In three instances samples

officially bought were adulterated with sodium bicarbonate. One of these gave the value 754 for M and 324 for P, multiplication by 0·1908 gave 142 and 62 per cent. of borax respectively. The reason for the difference is that with methyl orange in titration (1) $NaHCO_3$ neutralizes acid. ($NaHCO_3 + HCl = NaCl + CO_2 + H_2O$); in titration (2), however, no more alkali is used, $NaHCO_3$ being neutral to phenolphthalein.

Percentage of $NaHCO_3$ = 0·084 (M — P)
= 0·084 (754 — 324) = 36 per cent.
Percentage of borax .. = 0·1908 P
= 0·1908 × 324 = 62 per cent.

A mixture of three parts of borax and one of $NaHCO_3$ analysed in this way gave 74 per cent. of borax and 26 per cent. $NaHCO_3$.

If the adulterant had been sodium carbonate both titrations would have been affected according to the following equations—

$$Na_2CO_3 + 2HCl = 2NaCl + CO_2 + H_2O$$
$$2Na_2CO_3 + Na_2B_4O_7, 10H_2O = 2NaHCO_3 + 4NaBO_2 + 9H_2O$$

The calculations would then be—

Percentage of Na_2CO_3 = 0·0354 (M — P)
= 0·0354 (754 — 324) = 15 per cent.
Percentage of borax .. = 0·0637 (2P + M)
= 0·0637 (648 + 754) = 89 per cent.

A mixture of one part of Na_2CO_3, $10H_2O$ with three parts of borax analysed in this way gave 74 per cent. of borax and 9 per cent. Na_2CO_3, equal to 24 per cent. of Na_2CO_3, $10H_2O$.

From the two titrations we can, therefore, *assume* that the adulterated sample consisted either of—

$NaHCO_3$ 36 per cent. + borax 62 per cent. — 98 per cent.

or

Na_2CO_3 15 per cent. + borax 89 per cent. = 104 per cent.

The latter hypothesis appears the less likely, as the sum of the constituents is 104 per cent. This excess might not always appear in practice, and it is therefore necessary to make a third titration, so as to give three equations for the three unknowns, borax, $NaHCO_3$ and Na_2CO_3.

3. Dissolve 1 Gm. of borax in about 25 mils of water, and titrate, boiling, with N/2 HCl and litmus. The result multiplied by 50 gives the number of mils of normal acid required by 100 Gm. of borax (= L). L should approximately equal M

determined previously. Phenolphthalein is added to the titrated liquid, and after adding 30 mils of glycerin and 15 mils (or more if necessary) of N/2 NaHO, the liquid is titrated back with N/2 HCl. The number of mils of HCl used finally is subtracted from the number of mils of NaHO, and the difference multiplied by 50 equals the number of mils of normal alkali neutralized by the boric acid in 100 Gm. of borax (=II). The equations are—

$$Na_2B_4O_7, 10H_2O + 2HCl = H_2B_4O_7 + 2NaCl + 10H_2O \text{ and}$$
$$H_2B_4O_7 + 4NaHO = 4NaBO_2 + 3H_2O.$$

With the sample in question, L was equal to 770 and II to 690, and the calculation is—

$$\text{Percentage of borax} = 0{\cdot}0954\ II$$
$$= 0{\cdot}0954 \times 690 = 66 \text{ per cent.}$$

Unfortunately this titration was not repeated, but the result is sufficiently close to the 62 per cent. of borax calculated from titration (2) to show that the adulterant was $NaHCO_3$ and not Na_2CO_3, for in the latter case the litmus titration would have given about 89 per cent. of borax.

The bicarbonate can be calculated from titration (3) as follows—

$$\text{Percentage of } NaHCO_3 = 0{\cdot}042\ (2L—II)$$
$$= 0{\cdot}042\ (1540—690) = 36 \text{ per cent.}$$

This result agrees with that obtained by titrations (1) and (2), and confirms the opinion that the adulterant was $NaHCO_3$.

Carbonate may be calculated as follows—

$$\text{Percentage of } Na_2CO_3 = 0{\cdot}0265\ (2L - II)$$
$$= 0{\cdot}0265\ (1540 - 690) = 22 \text{ per cent.}$$

The disagreement of this result with the 15 per cent. of Na_2CO_3 obtained from titrations (1) and (2) again shows that the adulterant was not Na_2CO_3.

With a known adulterated sample the shortest way to obtain the percentage of borax present would be titration (3), but in ordinary cases I prefer to proceed as here stated.

Citrate of Iron and Quinine.

The amount of quinine yielded by eleven samples varied from 14·4 per cent. to 15·9 per cent., the proper quantity being 15 per cent. Five of them lost 6·9 to 8·3 per cent. of moisture on drying in the water oven, and yielded 18·9 per cent. to 19·3 per cent. of ash.

Dispensing.

Analyses have been made of forty-two mixtures, nine of them were more or less unsatisfactory. One of four Epsom salt mixtures was deficient in that ingredient, probably because an avoirdupois ounce was used instead of an apothecary's ounce. Nine bromide mixtures were correctly dispensed, and one was somewhat deficient of the chief ingredient. Of thirteen iodide mixtures, one was made with tap water instead of chloroform water, two were deficient in iodide of potassium, and two contained an excess of it. One of these was remarkable for its errors. The prescription ordered the 6 oz. to contain 360 grains with a teaspoonful dose. The bottle had a capacity of $5\frac{1}{4}$ oz., it contained 334 grains, and the dose was given as one tablespoonful, the net result being that a dose contained 32 grains of potassium iodide instead of $7\frac{1}{2}$ grains. The dispenser was unqualified. Four samples of quinine and iron pills were analysed, one of them contained nearly twice as much iron sulphate as was ordered. In each case the amount of quinine sulphate present was correct.

Epsom Salt.

One of the samples received consisted of sulphate of zinc. Apparently a quantity had been wrongly labelled, fortunately the mistake was found out before any one had been injured by taking the article.

Glycerin.

As a rule the samples analysed have been genuine, containing 4 per cent. of water and less. In a few instances minute traces of arsenic have been present. In 1897 two curious samples gave the following results—

	A	B
Specific Gravity	1·274	1·293
Specific Rotatory Power	32°	43°
Cupric reduction expressed as Glucose	11·5	18·5
Sugars, etc.	23·2%	28·3%

The sugars, etc., were obtained by treating the sample with a mixture of two parts of absolute alcohol and one of chloroform, and weighing the insoluble residue.

These samples were certified to be adulterated with 40 per cent. and 45 per cent. of dilute glucose syrup. I believe the samples were 1*d.* bottles put up by an unqualified vendor.

Oils.

Almond Oil.—Seventeen genuine samples showed little range in analytical figures. Specific gravity, 0·917 to 0·919; saponification value, 19·1 per cent. to 19·4 per cent. of KHO. They absorbed 95 per cent. to 99 per cent. of iodine. Three other samples were largely or entirely apricot kernel oil.

Camphorated Oil.—I believe the first prosecution in the country for adulterated camphor oil took place in Birmingham in 1897 for a sample which contained only 10 per cent. of camphor. The camphor was determined by the polariscope. In 1899 ten of the thirty-two samples examined were condemned, four of them were made of olive oil, but were deficient in camphor; six samples contained mineral or other foreign oil, the worst of them had less than 1 per cent. of camphor. During 1900 to 1904 only three out of thirty-five samples were adulterated. Last year twenty-seven samples were analysed, thirteen being more or less adulterated. Most of the defective samples were 1*d.* bottles put up by unqualified dealers. Three of the latter contained only 5 per cent. to 7 per cent. of camphor with 20 per cent. to 40 per cent. of paraffin oil. Another sample was prepared by an unqualified dealer, who took 20 oz. of olive oil by weight instead of by measure. Only 19 per cent. of camphor was present.

Castor Oil.—The specific gravity of fourteen samples varied from 0·9625 to 0·9652. Ten samples gave butyro-refractometric figures at 25° C. of 77·3 to 78·3. Nine samples examined in a 200 Mm. tube of the polariscope gave rotations of +8·6° to 9·2°. All the samples were passed as genuine. A mixture was made of 90 per cent. castor oil and 10 per cent. of cotton-seed oil. It gave specific gravity 0·9581, refraction 76·7, and rotation 7·8°.

Powders.

Compound Liquorice Powder. The amount of ash found in twenty-one samples was 3·8 per cent. to 6·4 per cent., one sample had only 2·9 per cent. The following method of analysis has been tried on four samples only. A weight of 2·4 Gm. was macerated in 60 mils of methylated spirit overnight and filtered, 50 mils (equal to 2·0 Gm. of the powder), was evaporated to dryness and dried in the water oven, the dissolved matter weighed 15·4 per cent. to 17·4 per cent. This determination was made to detect spent drugs. The undissolved residue was macerated

overnight with 30 mils of carbon disulphide and filtered. The filtrate was measured, evaporated to dryness, and dried. The dissolved matter was nearly pure sulphur, and amounted to 7·0 per cent. to 8·6 per cent., theory being 8·3 per cent. The undissolved residue was macerated with 60 mils of water two hours, filtered, and 20 mils (equal to 0·8 Gm. of the powder) evaporated to dryness and dried. The weight varied from 47·2 per cent. to 49·0 per cent., probably a little sugar had been dissolved by the previous extraction with spirit, but the results are nearly 50 per cent., which is the theoretical figure for sugar.

Gregory's Powder.—Four samples yielded 64·2 per cent. to 67·6 per cent. of ash, and 0·5 per cent. to 1·4 per cent. of CO_2. The fifth sample yielded 31·7 per cent. of ash and contained 19·0 per cent. of CO_2. The vendor stated that it had been made with carbonate instead of oxide of magnesium.

Seidlitz Powders.—These have not been at all satisfactory. The acid powder should weigh 38 grains, 14 to 55 grains were found. An alkaline powder ought to weigh 160 grains, weights found varied from 89 to 200 grains. The alkaline powders ought to consist of 25 per cent. sodium bicarbonate and 75 per cent. Rochelle salt. The sodium bicarbonate varied from 18·5 per cent. to 100 per cent., and the Rochelle salt from 0 to 81·5 per cent. One sample consisted entirely of $NaHCO_3$, and another was a mixture of 80 per cent. $NaHCO_3$ with 20 per cent. Na_2SO_4. In one instance the tartaric acid was wrapped in blue paper and the alkaline powder in white paper. The worst samples had been put up by unqualified vendors. One of them contained only half the proper quantity of tartaric acid and one-third of the right amount of Rochelle salt, while the $NaHCO_3$ was twice as much as it should have been. The box bore the following impudent label—

CAUTION TO THE PUBLIC.

Thousands of boxes of a common imitation of the genuine Seidlitz Powders are being sold by unprincipled Traders for extra profit. We guarantee all our powders to be genuine.

SAFFRON.

During the years 1889 to 1899, forty-seven samples were examined and seven condemned. The genuine samples contained 4·5 per cent. to 6·8 per cent. of ash. The moisture of twenty samples varied from 8·9 per cent. to 18·0 per cent. One

sample yielded 7·3 per cent. of ash, 1·1 per cent. of ash was insoluble in dilute HCl. Three samples were adulterated with 13 per cent. to 19 per cent. of dyed calendula florets. Another sample had 40 per cent. of sedge and 10 per cent. of colourless saffron. Two samples were adulterated both with mineral and vegetable matter. One of them yielded 32·8 per cent. of ash and 55 per cent. of dyed calendula florets, the other 35·1 per cent. of ash and 43 per cent. of dyed calendula florets. A sample of calendula florets was examined, it contained 6·5 per cent. of ash and 16·9 per cent. of moisture. A number of samples of saffron contained stamens, but I never considered the quantity found (1·1 per cent. to 2·1 per cent.) sufficient to be called adulteration.

Sodium Bicarbonate.

I have never found this article to be adulterated, but two samples bought at the same time proved to be borax. No doubt this was an accidental substitution, possibly "Sodæ Bibor." misread for "Sodæ Bicarb."

Spirits.

Spirit of Camphor.—The specific gravity of seven samples was 0·8457 to 0·853. In a 200 Mm. polariscope tube the samples gave rotations from 7·3° to 11·3°. The rotations multiplied by 1·25 (see my paper in *Chemist and Druggist*, January 28, 1899) give the amount of camphor, viz. 9·1 w/v to 14·1 w/v. Most of the samples were bought in 1896. In that year a sample had a specific gravity of 0·8513, and gave 7·8° of rotation; in 1903 the sample gave practically identical results, viz., 0·8512 and 8·0°. It had been kept in a corked bottle.

Sal Volatile.—Between 1890 and 1903 fifty samples were examined by the methods described in a paper given at a meeting of the Midland Pharmaceutical Association (*Pharm. Journ.*, February 23, 1895). Ten samples contained an insufficient quantity of carbonate, four of them were also deficient in ammonia. The CO_2 calculated as Am_2CO_3 varied from 1·48 to 3·80 w/v. Probably the variability of commercial ammonium carbonate was the cause of some of the deficiency of carbonate. If the ammonium carbonate can be replaced by an equivalent quantity of ammonium bicarbonate and solution of ammonia, I think manufacturers would have less difficulty in making a uniform product. This, is, however, an untried suggestion.

Sulphur, Milk or Precipitated.

Apparently the calcareous product is becoming extinct, between 1892 and 1900 only two samples were adulterated with calcium sulphate. These samples yielded 37 and 57 per cent. of ash, thirty-five genuine samples contained 0·05 to 0·95 per cent. of ash.

Tinctures.

Compound Tincture of Benzoin.—In a paper by Dr. Hill and myself (*Analyst*, November, 1901), the opinion was expressed that the solid extract in this tincture should amount to 18 w v, and that 16 w/v might be taken as the minimum limit. Since then twenty-six samples have been analysed, the solid matter varied from 16·7 w/v to 22·6 w/v, with an average of 18·5 w/v. The specific gravity varied from 0·894 to 0·911. The reasonableness of the suggested standard has been supported by other workers.

Paregoric.—The first samples analysed were bought in 1890, four of the ten examined had been wrongly prepared. One contained no opium, one contained too little spirit and no oil of aniseed, and two samples contained about 30 per cent. of glycerin and were free from spirit and oil of aniseed. Twelve samples bought in 1900 and 1901 were all genuine, they had specific gravity 0·912 to 0·929, the benzoic and meconic acids were from 0·48 w/v to 0·52 w v, and the solid extract varied from 0·32 w v to 0·43 w/v.

Tincture of Iodine.—In 1894 I reported to the Conference on twenty-five samples. (*Year-Book*, 475). Half of the fourteen samples examined in 1895 were incorrectly prepared. The worst sample contained two and a half times the proper quantity of iodine and one and a half times the proper quantity of iodide of potassium and also 10 per cent. of glycerin. Three other samples contained an excess of iodine, two were deficient in iodide of potassium, and one other sample was deficient of both ingredients. Seventeen samples bought in 1901 1903 were much better, only two being reported against. In one of them the greater part of the potassium iodide had been replaced by sodium iodide.

White Precipitate Ointment.

Two samples were genuine yielding 0·1 per cent. or less of ash, the non-fatty residue weighed 10·8 per cent. and 10·0 per cent.

respectively. Each ointment absorbed 10 per cent. of iodine by the Hübl method, and gave a butyro-refractometer figure of 45·7 at 45°C. One sample contained an excess of white precipitate yielding 13·8 per cent. of non-fatty residue. Another sample had been made with zinc carbonate instead of white precipitate, the ash was 8·0 per cent., paraffin had not been used as the basis, as the ointment absorbed 78 per cent. of iodine. The last sample contained 2·5 per cent. of white precipitate, and 12 per cent. of zinc oxide. I believe each of the adulterated samples was obtained from unqualified dealers.

Wood Charcoal.

Seven samples yielded 2·7 per cent. to 7·0 of ash, being below the Pharmacopœia requirements. Other samples contained 12·0 per cent., 11·4 per cent., and 10 per cent. of ash. The last sample contained 4 per cent. of ash insoluble in dilute HCl.

In conclusion I should explain that the late public analyst, Dr Alfred Hill, was responsible for all certificates given before 1902, and that part of the above analytical work was performed by past and present assistants, R. M. Caven, D.Sc., E. T. Shelbourn, F.I.C., and H. S. Shrewsbury, A.I.C.

The President remarked that he was sure they all would agree that the paper which Mr. Liverseege had been good enough to read was useful as a record of facts, and also was informative and suggestive. He had no doubt a good discussion would follow. There were just one or two remarks he should like to make. The first was in regard to the detailed particulars given respecting the analysis of borax, which were of considerable assistance. Those details were quite new to him. Was it possible—or, rather, probable—that in the case of the mixture deficient in Epsom salts the deficiency was in no small measure due to the difference in the degree of dryness of the sample taken? Epsom salts was a commercial article, and did not contain a uniform percentage of water. If it was not troubling Mr. Liverseege too much he should be glad to have a few additional particulars about the examination of glycerin for glucose. He did not quite understand why the detection of glucose and its quantitative estimation should have been so difficult. The author had referred to the use of the refractometer in detecting adulteration of castor oil. He should like to ask if the author

had had much experience in the use of this instrument for detecting adulteration in essential oils. He (the speaker) was not inclined to attach very much value to its use in that direction. It would be very interesting to have the experience of members present as to the methods they had adopted for the examination of compound liquorice powder. For some considerable time he himself had determined sulphur by oxidation, but he thought the bisulphide of carbon method might be more accurate. In reference to compound tincture of benzoin, he had read most of the published statements in regard to the amount of extract this tincture should yield, but the details given were very generally insufficient and were often somewhat misleading. He did not remember whether in the papers by Dr. Hill or Mr. Liverseege, they stated if the tincture was to be evaporated and dried over a water-bath until the residue was of constant weight, which was not easily attained. He thought some definite statement should be made on that point, because the amount of extractive obtained by one analyst differed from that of another, and, of course, everything depended upon the method adopted.

Mr. Umney asked whether the author had a handy method for estimating the sugar in compound liquorice powder. He also asked whether a compound tincture of benzoin, containing 17·5 Gm. of extractive per 100 mils would be considered inferior to a tincture of benzoin containing 21·5 Gm. per 100 mils since in this tincture the extractive was cheaper than the alcohol.

Dr. Symes, referring to the mixture found by the author to be deficient in Epsom salts, said it was possible that so large a quantity might have been weighed on big scales, and that the paper had been weighed with it. But more likely the dispenser had used the avoirdupois ounce, which was the one recognized in the Pharmacopœia.

Mr. Finnemore said he would like to emphasize the statements of the Chairman as to the necessity of some uniformity in the published statements on the extractive of compound tincture of benzoin, also in regard to the extractive from commercial benzoin. In his experience one could obtain any amount of extractive one liked. With regard to compound liquorice powder, would the author say if commercial sublimed sulphur were soluble in carbon bisulphide, as in his experience it was not so, therefore any method based on this would be liable to this error.

Mr. Mann said the practice in the laboratory with which he was connected was to dry benzoin residues until a constant loss was obtained in a fixed time. With regard to compound liquorice powder, he confirmed Mr. Finnemore's remarks regarding the insolubility of sublimed sulphur in carbon bisulphide, and drew attention to the fact that carbon bisulphide frequently contained free sulphur, and, even after purification, would, on keeping, be found to contain this impurity.

Mr. Gadd, who at the outset of his remarks said public analysts often seemed to want a sense of proportion, expressed the opinion that the paper was of more importance by its omissions than by what was in it. He (Mr. Gadd) thought the estimation of aromatic acids in compound tincture of benzoin was of greater importance than that of the extractive. Having referred to compound rhubarb powder and compound liquorice powder, he congratulated the author on his pluck as a public analyst in coming among a body of pharmacists.

Mr. Alcock said the author was an ideal public analyst who had the advantage of a training in pharmacy. Referring to the author's remarks on arrowroot, he (Mr. Alcock) would regard the case of *tous-les-mois* mentioned as a case of substitution and not one of adulteration. He did not think that maize starch should be sold as arrowroot. He thought the sample of Epsom salt adulterated with sulphate of zinc was probably due to a mistake made by a porter owing to two barrels being placed close together. With regard to the adulteration of glycerin with glucose, Mr. Alcock advised pharmacists when buying tins of glycerin from Germany to examine it carefully for sucrose, as he had come across a case where a large proportion of sucrose was present. He accounted for the improvement in the samples of camphorated oil examined by Mr. Liverseege by mentioning that it was only in 1898 that the synonym "Camphorated Oil" became official; before that time it was customary to make the preparation with any oil. Referring to the method of determining the sulphur in compound liquorice powder, Mr. Alcock said that he desired to emphasize the fact that sublimed sulphur was not always entirely soluble in carbon disulphide. Precipitated sulphur was soluble, and might be suggested in place of the other. Previous to 1890 seidlitz powders had been found to contain tartar emetic in small quantities and also sodium sulphate. The tartaric acid he had never put in a white paper, but always in a specially

prepared greyish-blue paper (Maw's). He asked whether the author had ever found safflower as an adulterant of saffron. Were the calendula florets safflower? Compound tincture of benzoin was a sore point in Birmingham, and it should be said that it was not fair to conclude that a 14 per cent. sample was not so good as one which had even 21 per cent. of solids. The question was, rather, on what does its efficacy depend, and whether these active constituents were present in proper amount. In some dealers' shops in Birmingham (where drugs were sold, but ought not to be) chalk ointment was sold as white precipitate ointment and red lead as red precipitate ointment. These, like the previous instances, would fall under the ban of the public analyst.

Mr. GILMOUR, as a retail pharmacist, endorsed the tribute which had been paid to Mr. Liverseege. Continuing, he referred to samples of saffron which he had examined which yielded 33½ per cent. of ash, the greater part of which was sulphate of barium.

Mr. CRIPPS, speaking as a pharmacist and a public analyst, said retail chemists were inclined to lay far too much blame at the door of the public analyst. It was more often the medical officer of health or a committee of the town council who had the final decision as to prosecution, and not the public analyst. Speaking of saffron, he warned pharmacists that it was not only necessary to look for admixed florets, because ammonium nitrate was also an occasional adulterant. Referring to compound tincture of benzoin, he said total resinous matter should be there in good proportion, on account of the use of the tincture as a styptic. In conclusion, he said he had not recently met with cases of large adulteration in samples taken from chemists; unqualified dealers were the offenders.

Mr. M. JONES wondered whether the defective samples of paregoric mentioned were labelled "paregoric" or "paregoric substitute."

Mr. J. R. HILL spoke in appreciative terms of the extremely practical paper contributed by Mr. Liverseege. He would like to see public analysts brought into closer touch with pharmacists so that clear understandings could be arrived at in reference to certain matters. Referring to "standards," he said it must be remembered that the question as to whether the British Pharmacopœia was the standard was a matter of opinion and not of settled law. He gave it as his opinion that the Courts

must determine on the merits of each case what was the proper standard. If a name of a well-known article were (after the article had been in existence for many years) included in the B.P., the mere introduction of that name did not mean that the B.P. standard for it was necessarily the legal standard. The Sale of Food and Drugs Act was intended to deal with fraudulent or injurious adulteration, and not with an immaterial departure from the absolute B.P. standard in such a matter as the camphorated oil referred to by Mr. Cripps. The fact that it provided for a £20 penalty was an indication that such was the case. The B.P. was not a public book, and the medical profession would probably strongly object to its being made such; and how, therefore, could it be made a standard for an Act of this kind? It was a medium for a common understanding between prescriber and dispenser, but its provisions were not enforced by any penal statute in the selling of medicines. He would like to see a list of statutory standards drawn up by a Royal Commission comprising public analysts, health officers and members of the British Pharmaceutical Conference.

Dr. Symes, referring to the question of the composition of Gregory powder, said the kind of magnesia which should enter into its composition was a matter of opinion, and in his experience the carbonate was preferable. He suggested there might be a B.P. preparation of compound rhubarb powder as well as a Gregory powder, magnesium carbonate being used in the one case and calcined magnesia in the other.

Mr. Dott thought too much was made out of the adulteration of camphorated oil, and he thought that a very slight deficiency of camphor was not an extremely serious matter. Referring to the discussion on compound tincture of benzoin, he thought the nature of the extractive was of more importance than the amount.

Mr. Knight, criticizing the action of public analysts, said that, notwithstanding the appeal in the Runcorn milk of sulphur case, they had made it so irksome that chemists declined to keep what was wanted by the public, and as a consequence the sale of milk of sulphur had been killed to a great extent. Why did not some bold spirit take on the arrowroots, as it was a positive fact that many vendors sold from 6*d*. to 3*s*. per pound out of the same jar? He presumed they feared they might be challenged, and like a cod-liver oil case and several sweet nitre cases, when contested, be dismissed, and the reputation of the analyst suffer.

Mr. LIVERSEEGE, in reply, said he had a "fairly large order" to deal with in the number of questions which had been put to him. In the case of the Epsom salt mixture, the prescription was written "ʒ," which he took to mean 480 gr., and "oz." sign to equal 437·5 gr. Well, he ordered "ʒ" and got 441 gr., so that there was something wrong. As to the case of glycerin in which glucose was found, it would not be correct to regard it as the only adulterant. The purpose of using it was to work in a quantity of water, and it was in determining the three ingredients—glycerin, glucose, and water—that the difficulty existed. The only essential oil for which he had used the refractometer was turpentine, the method being very useful for testing the fractions. The method he had adopted for the residue of compound tincture of benzoin was to evaporate it to dryness on a water-bath and dry for three hours in a water oven. That method was as definite as the direction could be made. There was a sublimation of volatile acid on the inside of the dish. In reply to the question as to whether he would pass samples of compound tincture of benzoin with 17·5 and 21·5 per cent. of extractive, he added that 16 per cent. was the minimum limit he had suggested, and both such samples would pass.

THE EXAMINATION OF SOME COMMERCIAL MALT EXTRACTS.

BY E. F. HARRISON, B.Sc., F.I.C., AND D. GAIR, B.Sc., A.I.C.

[The lamented death of my friend Duncan Gair cut short the carrying out of some work on malt extract on which we were engaged; the following fragment is, however, sufficiently complete in itself to bring forward. I hope to continue the work when other engagements permit.—E. F. H.]

The production of malt extract has been greatly on the increase for some years, and has now attained very large proportions. As there have never been any official directions for the preparation of this article, or accepted standards to which it must conform, it appeared to us to be of some interest to place on record the results obtained in the examination of some of the principal makes now being sold.

Before criticizing any such product, it is necessary to decide what are the qualities that it ought to possess. Malt extract perhaps finds its widest use as a vehicle for cod-liver oil and for

many medicinal agents; but, whether taken in this way or alone, it must be regarded as a food rather than a medicine; and it is with its qualities as a food that we are here chiefly concerned. A pure malt extract contains more than half its weight of maltose: it should also contain a proper proportion of the nitrogenous constituents of the grain, and if properly prepared it will further possess sufficient undestroyed diastase to be capable of exerting considerable digestive power on gelatinized starch: an obvious additional requirement is that it shall not contain too high a proportion of water.

In the table below the characters just mentioned are given in figures for thirteen different samples of malt extract. Nos. I. to VI. are widely advertised articles, sold under special brands; No. VI. is not in the usual viscous condition, but is a so-called "crystallized" extract, in the form of a dry, somewhat granular, coarse powder. Nos. VII. to X. are extracts supplied in bulk by London wholesale houses, and XI. to XIII. are those supplied in bulk by provincial wholesale houses. It is unfortunately the fact that No. I., which shows such a marked superiority, does not come from a pharmaceutical source at all.

The methods adopted were as follows—

Total Solids.

Twenty grammes of extract was dissolved in water and made up to exactly 100 mils and the specific gravity of the solution determined by means of a Regnault's bottle. From the figure obtained for specific gravity, water being taken as 1,000, the percentage of total solids in the original extract was found by the formula—

$$\text{T. S.} = \frac{\text{sp. gr.}—1{,}000}{3{\cdot}92} \times 5.$$

This conventional method does not give perfectly correct results, but the error introduced is of no importance for our present purpose; the determination of total solids by actual desiccation and weighing is a tedious and somewhat difficult matter, and quite unsuitable here.

Maltose.

Five mils of the solution as used for specific gravity was diluted to 100 mils and the resulting solution, containing 1 Gm. of extract in 100 mils was used to titrate Fehling's solution. 10 mils

of Fehling's solution was diluted with 40 mils of water and boiled in a porcelain beaker, and the malt solution run in from a burette until exactly all the copper was reduced. For determining the end-point, the starch-iodide indicator, described by one of us to the Conference in 1903 (*The Pharmaceutical Journal*, August 1, 1903, p. 170), was always used. Since 10 mils of Fehling's is reduced by 0·0805 of maltose, the percentage of maltose in the extract is given by the expression $\frac{805}{m}$ where m stands for the number of mils used.

Proteid.

The total nitrogen of the extract was determined by the Kjeldahl-Gunning method, and the result multiplied by 6·3 was taken as proteid, as usual.

Diastase.

The method employed for ascertaining the diastatic activity of a malt extract has usually in the past been that of Lintner, which consists in adding varying quantities of the extract to tubes containing a fixed quantity of starch mucilage, and after allowing digestion to proceed for a certain time, adding iodine to the tubes in turn, commencing with the one to which the smallest quantity of extract has been added. When the first tube is reached, in which iodine no longer produces a blue colour, it is known what is the smallest quantity of extract capable of converting the weight of starch taken in the given time. By repeating the trials, with quantities of extract only differing slightly (in both directions) from the quantity first found, fair accuracy may be obtained. It is obvious that instead of determining by a number of trials how much starch is converted, the same information might be obtained in one test by employing excess of starch and determining the amount of conversion-products formed in a given time. This method was first devised by Dr. H. A. D. Jowett, and is the plan we have followed. The figures obtained in this or any other method are, of course, only comparative; the actual amount of diastase present is not directly proportional to the amount of change in a given time, since the change does not proceed at a uniform rate, but at a continually diminishing rate, the reaction being of the type known as reversible; the formula for the time-rate of change is not, however, the simple logarithmic formula, as has been shown by Brown and Glendinning (*Journ. Chem. Soc.*, 1902, 388,

Trans.). The products of the hydrolysis of starch by means of diastase are maltose and a series of dextrins; the former of these can be simply determined by means of Fehling's solution, and we have proceeded in this manner. What is actually so found is the proportion of starch that has been converted as completely as possible by the diastase. It is, of course, not the case that the remainder of the starch is unaltered, as more or less of it will have been converted to dextrins. It has been shown by Brown and his co-workers that when the action of diastase on starch is complete, part of the dextrin remains in the final product, which consists of 81 per cent. of maltose and 19 per cent. of dextrin, in accordance with the equation—

$$\underset{\text{Starch.}}{5C_6H_{10}O_5} + 2H_2O = \underset{\text{Maltose.}}{2C_{12}H_{22}O_{11}} + \underset{\text{Dextrin.}}{C_6H_{10}O_5}$$

so that 100 parts of anhydrous starch yield 84·4 parts of maltose.

In carrying out the test we have employed potato starch; in order that the same amount may be used in every case, it is necessary to determine the amount of moisture present in the specimen taken, since starch is not easily completely dried without overheating. We have found it better to completely digest a weighed portion of the starch, and from the maltose produced calculate the amount of anhydrous starch in the weighed portion taken. To do this the starch is made into a mucilage as described below, and after cooling this to 46°, an amount of active malt extract, known to be more than enough to completely convert the starch, is added. An equal amount of the extract is put into another flask and diluted to the same volume as the total volume in the first. The two flasks are then kept for six hours at 40°C., and the maltose in each determined by dilution and titration. The difference is the amount formed from the starch, and the weight of maltose multiplied by 1·184 gives the weight of anhydrous starch.

To determine the diastatic power of a malt extract, that amount of starch is taken which contains 1 Gm. of the anhydrous substance, mixed in a mortar with a few mils of cold water and poured into 65 mils of boiling water. The mortar is rinsed with a little more water to make 15 mils in all, or a total of 80 mils of mucilage, which is boiled for about a minute to ensure complete gelatinization. The mucilage is then cooled to 46° C., and to it is added 20 mils of the same solution of malt extract as was used for the titration of maltose. This solution contains 1·0 of extract in 100 mils, so that the quantity of

extract taken to digest the starch is 0·2 Gm. The mixture is then kept at 40° C. for exactly half an hour, then boiled to stop the action going further.

The liquid is then cooled and adjusted to measure 100 mils, and 10 mils of Fehling's solution is titrated with this as described above. From the maltose found it is necessary to deduct the maltose introduced with the extract. The calculations may be combined by the use of the following formula—

$$\text{Weight of anhydrous starch completely converted} \ldots = 1{\cdot}184 \left(\frac{8{\cdot}05}{n} - \frac{1{\cdot}61}{m} \right)$$

Where n is the number of mils used in the last titration, m (as above) is the mils used in the former maltose titration, and 1·184 is the factor $\frac{100}{84{\cdot}4}$ for calculating maltose into starch.

The diastatic power may be conveniently expressed numerically by the weight of starch converted by one part of the extract, or, to avoid fractions, by 100 parts. The figures given in the table for diastase represent accordingly the percentage of starch which the extract is capable of completely converting in half an hour at 40° C. Since 0·2 Gm. is the weight of extract taken for the test, the above result must be multiplied by 500 ; or

$$\text{Diastatic value} = 592 \left(\frac{8{\cdot}05}{n} - \frac{1{\cdot}61}{m} \right)$$

Sample.	Total Solids Per Cent.	Maltose Per Cent.	Proteids Per Cent.	Diastatic Value.	Remarks.
I. . .	73·2	65·4	6·7	468	—
II. . .	79·8	64·4	5·3	346	—
III. .	69·8	58·5	5·5	356	—
IV. .	77·0	54·0	3·6	10	—
V. . .	72·3	52·1	3·8	15	—
VI. .	95·9	82·1	5·7	89	Solid Extract.
VII. .	76·8	66·0	6·1	96	Considerable salicylate present.
VIII. .	74·3	62·5	6·1	65	Ditto.
IX. .	73·0	47·1	3·8	17	9·5 per cent. of cane-sugar present.
X. . .	66·2	49·7	3·9	0	—
XI. . .	78·7	74·2	5·5	268	High maltose figure probably due to glucose.
XII. .	64·9	58·8	3·9	0	—
XIII. .	73·9	63·6	6·6	137	—

The PRESIDENT was sure they were greatly indebted to Mr. Harrison for bringing the examination of commercial malt extract up to date. He should like to ask Mr. Harrison what method he recommended for the detection of commercial glucose which may have been added to malt so as to affect its commercial value.

Mr. CRIPPS considered it important that the exact kind of starch employed in testing for diastase should be defined; he had obtained different results with arrowroot and potato starches.

Mr. MANN asked if Mr. Harrison could explain why malt extracts of high diastasic value were particularly prone to crystallize.

Mr. UMNEY said that crystallization was a very serious difficulty; he should expect that Samples I. to III. would crystallize within two months, and would be glad to know if that were so.

Mr. ALCOCK asked if Mr. Harrison had determined the alkalinity of the ash, as he had found that the addition of a very small proportion of potassium carbonate was able to prevent crystallization occurring.

Mr. FINNEMORE confirmed the opinion expressed as to the value of malt extracts. Medical men looked on them as foods, and they (medical men) would not go out of their way to buy malt extracts when such things as golden syrup were so cheap. He attributed the fault to the manufacturers. He had had occasion to examine malt extracts which were supplied to institutions; some were very good, and one in particular, which was not from a pharmaceutical source. With respect to the question of glucose, he would ask Mr. Harrison whether he had tried testing for sulphur dioxide, which he had often found present. He considered the picric acid test for diastase to be of some value.

Mr. COSH asked whether glucose was as good as maltose as a food, and drew attention to Sample No. XI., which had high diastasic value with added glucose.

Mr. HARRISON, in reply, said that a very high figure for maltose obtained in titration with Fehling's solution would probably indicate glucose, but he did not think this could be proved in any better way than by separation by means of phenylhydrazine. He agreed with Mr. Cripps that the kind of starch used was of importance, and they had therefore specified potato starch and used it in all cases. He suggested that the crystallization which Mr. Mann referred to in extracts containing

much diastase might be due to gradual increase of the maltose by conversion of the dextrin of the extract. In reply to Mr. Umney, he had kept samples of Nos. I. and III. for eighteen months or so, and of No. II. for several years, without crystallization occurring, but it should be noted that I. and II. were very thin extracts. He had not determined the alkalinity of the ash, nor tested for sulphite. He did not think the estimation of diastase by picric acid precipitation could be so satisfactory as actual determination of digestive power.

THE DETERMINATION OF THE AMOUNT OF NITROGEN IN SOME COMMON DRUGS BY THE KJELDAHL-GUNNING PROCESS.

By F. H. Alcock, F.I.C.

Scattered throughout the pages of the books devoted to drugs will be found figures representing the amount of total nitrogen present in common drugs, but, except in a few instances, no reference is made to the process by which the results were obtained. In *Pharmacographia* it is stated in several places that the soda-lime process had been employed. The moist combustion process first suggested by Kjeldahl and modified by subsequent workers has received much favour in recent times, owing to its simplicity and tolerable accuracy, and has become very acceptable to the commercial analyst for the determination of total nitrogen in food materials and fertilizers.

In the course of work of this kind it occurred to me to inquire into the subject as far as drugs alone were concerned, and, finding but little information, it was thought desirable to undertake the investigation and offer the same to the Conference. The more common drugs were selected representing ordinary trade samples of good commercial quality and supplied to me by the retail pharmacist, a few were museum specimens, and many had been in stock several years. Examples were taken as representing different parts of plants, a few from the animal kingdom and one or two preparations.

Reference may here be made to the figures for "Horse-powder Liquorice" and the official article for the reason that the former has been the subject of careful scrutiny in very recent times, and has been found wanting. Almond pericarps have been included in the list, but olive stones have not yet passed through

my Kjeldahl mill. The exact process followed (omitting working details which require careful manipulation owing to numerous causes) was—

Five grammes of drug was taken and placed in a ½-litre Jena glass flask and warmed gently with 40 mils of pure strong sulphuric acid, sp. gr. 1·843. After charring had ensued, 30 mils more acid were added, together with 10 Gm. of potassium sulphate, and the whole boiled in the fume chamber until the colour of the char gave place to a white or very pale yellow coloured liquid, this occupying a varying period of from six to twelve hours, the final volume being about 50 mils. Dilution with 500 mils distilled water followed, excess of a very strong solution of pure sodium hydrate being then added and distillation of the ammonia gas into standard normal sulphuric acid —the usual quantity being 20 mils diluted with 20 mils of distilled water, except in a few cases, where 40 mils of acid were used, and in two instances 60 mils. The time required for the distillation varied from one to two and even three hours, the rate of distillation was kept as uniform as possible. The distillation flask used was a litre Jena glass flask (resting upon a thin iron sand tray), and survived—to its great credit—the whole of the operations, numbering about seventy-five, but the flasks used for the sulphuric acid treatment occasionally gave way under the strain, and all were more or less corroded where the acid remained at the bottom of the vessel. On no occasion was bumping experienced, but frothing in the case of a few of the experiments was a sore trouble, and necessitated several repeats. The form of apparatus used for the condensation of the distillate was the usual system plus a column of broken glass about 9 in. long and ½ in. wide, moistened with a few mils of the normal acid. All tubes were of combustion glass and the stoppers were of rubber.

Since operating on pepper I have learnt that in this case the whole of the nitrogen is not given up as ammonia, and that a special modification has to be adopted, but my figures agree fairly well with those published. I have not ventured to express the figures as albuminoids because workers have suggested various figures, the general opinion being that 6·25 fairly represents the conversion figure for albuminoids, but the nitrogen would come from other sources also in the case of vegetable drugs, such as alkaloids, glucosides, asparagin and other nitrogenous constituents.

The common presence of nitrates in drugs, notably some roots and leaves, has not been lost sight of, and experiments in this direction are reserved for a future paper.

The calculation for 5 Gm. of substance is 0·28 × mils of normal acid neutralized equals the percentage of total nitrogen found in the drug operated upon, and this the figures below represent—

Seeds.

Nux Vomica	1·70	Bitter Almonds	3·44
Sweet Almonds	3·33	Strophanthus	4·08
Macaroni Almond Paste	4·22	Roasted Coffee	2·35
Cocoa	3·47	Calabar Bean	3·23
Linseed	3·75		

Leaves.

Indian Senna	2·24	Alexandrian Senna	2·49
Tea	4·06		

Barks.

Cassia (whole)	0·42	Cinchona (official)	1·23
Cassia (powdered)	0·98	Cinchona (exhausted)	0·93
Cinnamon (whole)	0·75	Frangula	0·70
Cinnamon (powdered)	0·64	Cascara Sagrada	0·70

Roots.

Ipecacuanha	1·76	Exhausted Liquorice	1·12
Decorticated Liquorice	2·14	Rhubarb (E. I.)	1·68
Horse Powder Liquorice	1·19	Sarsaparilla	1·12

Corms and Bulbs.

Colchicum	0·95	Squill	0·58

Woods.

Quassia	0·44	Almond Shells	0·28

Flowers.

Chamomile	1·30	[1] Saffron	1·73
Dalmatian	1·49	Santonica	2·07
Cloves	1·00		

Fruits.

Cocculus Indicus	1·54	Fennel	2·57
White Pepper	1·79	Juniper	0·67
Black Pepper	1·87	Capsicum	1·93
Long Pepper	1·87	Pimento	0·92
Colocynth Pulp	1·62		

[1] Lost 21·6 per cent. at 100°C.

Juices, Etc.

Solazzi Juice	1·90	Cape Aloes	0·39
Antonelli Juice	2·40	Pale Catechu	0·67
[1] Ext. Liquorice, B.P.	1·68	Black Catechu	0·39
Opium	3·58	Kino	0·30

Animal.

Cantharides (1)	11·06	Stick Lac	1·28
Cantharides (2)	9·38	Pepsin of the Pig (Bullock's)	10·75
Cantharides (3)	8·40	Gelatin (1)	15·28
Cochineal	5·82	Gelatin (2)[8]	14·86

Miscellanea.

Ergot	3·16	Iceland Moss	0·67
Aleppo Galls	0·56	Irish Moss	1·12
English Galls	1·14	Podophyllum Resin	0·42
Lycopodium	1·48		

The President having called for discussion,

Mr. Wakefield said that the sample of Antonelli juice examined by Mr. Alcock was much cheaper than Solazzi juice.

Mr. Liverseege thought Mr. Alcock's was a very interesting paper. It was extremely useful to be able to determine the constants. It was surprising how difficult it was sometimes to find out most commonplace facts about commonplace things. With regard to the method of distillation, he (the speaker) had sometimes used a steam distillation plant.

Mr. Harrison agreed as to the convenience and usefulness of some modification of the Kjeldahl method. He was accustomed to use a small quantity of mercury with sulphuric acid; in this way the time of heating was much reduced, and one to two hours was usually enough. It was wise to continue the heating for half an hour after the liquid was colourless. In the distillation it was a great advantage to place a few pieces of granulated zinc in the flask, which caused steady boiling without bumping.

The President called upon Mr. Alcock to reply on the discussion.

Mr. Alcock said he had tried most modifications, but preferred to use the simplest method prescribed in the note. He

[8] Lost 26·42 per cent. at 100° C.

had also tried the addition of other substances to shorten the H_2SO_4 process, but hoped to be able to record the experiments later. He showed a diagram of the form of apparatus he had used to collect the ammonia, in which the gas passed through the normal acid and the vapour which is formed passed through a column of glass acidulated with acid, having a plug of tow with litmus papers spread upon its surface to detect any loss of ammonia.

ON A NEW AND SIMPLE METHOD OF MOULDING BOUGIES.

By A. W. Gerrard.

The customary method followed in this country, and no doubt elsewhere, by pharmacists for moulding urethral bougies is by means of metal moulds. The shape of these moulds is too well known to need description; they turn out bougies about 2½ in. in length. Sometimes the surgeon requires a bougie longer than 2½ in.; in fact, I have frequently had them ordered 4 in. and even 6 in. in length. To provide these special lengths, special moulds have to be made for the purpose, and as they are costly the ordinary pharmacist is scarcely justified in undertaking the necessary outlay.

The simple tools which I purpose introducing to your notice are easily at the command of every dispenser of medicine, they can be had for a few pence, and with them excellent bougies of any required length can be quickly and economically made. All that is required is a few pieces of glass tubing of even bore, a piece of glass rod to act as a piston, and a piece of rubber tubing to act as a suction tube. These constitute the whole apparatus. The glass tubing should be in about 8-in. lengths, having as near as possible an internal bore equal to the circumference of a No. 9 catheter. The glass piston rod should be 12 in. in length and of a circumference to pass easily through the tubes. A piece of rubber tubing 18 in. long should fit easily over one end of the glass tubes.

The method of operating is as follows:—having prepared the melted and mixed ingredients in the usual manner, place in the mixture one of the glass tubes, to which is attached the suction

pipe, and by means of the mouth draw up the melted mass to the required height in the glass tube, promptly pinch the rubber tubing, so as to hold up the fluid, then transfer quickly to a vessel of iced water, or to water cooled by a freezing mixture. Having filled your series of tubes, six for example, the bougies may at once be forced from their moulds by means of the glass rod and cut to the required length. To give the bougies a rounded point, they may be held carefully with a piece of clean cloth, and one end twisted round between the fingers and thumb of the right hand until the point is formed. Every part of the operation is simple and easy, needing but little practice. The cleaning of the moulds is best done by placing them in hot water, and on removal draw through them a pledget of cotton-wool fixed to a thin wire or one of the brushes used for cleaning feeding-bottle tubes answers very well. As a simple cooling mixture, where ice is not to be had, a few ounces of sodium sulphate dissolved in 10 oz. of water will be found effective.

It may be useful to know that delivery of the bougie from the mould is facilitated by adding 5 per cent. each of beeswax and lard to the cacao butter base.

Suppositories can be made by the same method, using wider tubing.

Mr. J. R. Hill thought the paper was very useful to the dispensing chemist. He had followed a similar plan more than twenty years ago in Edinburgh. Now that Mr. Gerrard's paper had been read the method would no doubt be widely adopted.

Dr. Symes said he had been accustomed to use boxwood moulds lined with tinfoil.

Mr. Gadd mentioned that he had recently examined some bougies which would not melt. The reasons were that too much of the active ingredient had been mixed with too little cacao butter, and wax had been added.

Mr. M. Jones said the discussion would be of great value to dispensing chemists.

Mr. Gibson advised that the glass rod should be pushed through the tube before filling to ensure that the bore was all right.

Dr. Walsh welcomed this type of paper. He thought that

the stereotyped methods it was customary to adopt nowadays had not the effect of fostering the ingenuity of the apprentice.

Mr. SOUTHALL remembered the time when bougies were first made. He mentioned that in those days there was no lack of things to exercise the ingenuity of the apprentice.

Mr. GERRARD said that one disadvantage in using the ordinary moulds was that the suppository mass was of a thick consistence and would not pour well.

NOTE ON THE DETERMINATION OF FIBRE IN DRUGS.

By HENRY WILLIAMS JONES.

In the microscopical analysis of powdered drugs I have frequently found it of distinct advantage to supplement the examination of the original powders by a further examination of the residues left after treatment with acid and alkali as generally used for the determination of fibre. By this means the bulk of the powder is so diminished that small percentages of foreign bodies, as ground olive stones, are clearly observable.

The tissues, freed from the usual cell-contents, stand out in a well-defined manner, and are readily stained with fuchsine and other agents. The amount of woody fibre can also be weighed and compared with that obtained from a standard sample. So far, little attention has been paid to the percentage of fibre in drugs, judging from published results; and with certain spices as pepper two sets of figures have been given. These differ widely owing to the fact that some are the result of acid treatment alone, and others obtained by digesting with both acid and alkali.

For the purpose of "concentrating" a powder I have used a modification of the acid and alkali method. This consists in passing strong liquid ammonia (0·880) through the washed residue after acid treatment. The trouble of removing the marc from the filter paper is entirely obviated, and the time is saved of a second boiling. The results obtained are, quantitatively speaking, not comparable with those which would be obtained with the old process of acid and soda, but they might be made a basis for factors of certain drugs; and the joint treatment would certainly give a better set of figures than acid

treatment alone. The figures appended, and obtained with three genuine commercial samples, will show the capabilities of the process.

1. *Acid treatment* indicates the result by Stokes' process (*Analyst*, **12**, 147), quoted by Pearmain and Moor (*Aids to the Analysis of Foods and Drugs*).

2. *Acid and Alkali.* – As described by Church in his *Laboratory Guide*.

3. *Ammonia Method.*—Suggested with the following details: Treat 1 gramme of the powder in a porcelain dish with 20 mils of water and boil for three minutes, preferably on an iron plate. Add 50 mils of 10 per cent. sulphuric acid, and continue boiling for one minute. Place on the water-bath and treat for two hours, adding water to replace that lost by evaporation. The aperture of the water-bath should be of a sufficient size so that the whole contents of the dish are kept fully heated. Collect the insoluble residue on dried and tared acid-washed filter paper, free from ash. Remove all traces of acid by washing with water. Drain, and cover the funnel with a watch glass, using several amounts of strong liquid ammonia (0·880) until the filtrate appears colourless. This part of the process should not be hurried. Treat with alcohol (90 per cent.) to remove a further amount of soluble matter, and wash with more of the spirit. Use ether for the final washing; dry at 100°C. Cool and weigh in a closed tube, burn the filter and contents, and deduct ash.

Percentage Results.	Pepper.	Gentian.	Liquorice.
Acid Treatment	9·1	26·0	29·4
Acid and Alkali	5·5	12·6	19·1
Ammonia Method	5·7	15·7	24·2

The PRESIDENT considered that the note was most useful, and the process seemed capable of wide application. They all hoped that Mr. Jones would extend his knowledge of it.

Professor GREENISH said he had for some time used a process similar to that recommended by Mr. Jones for the removal of starch and other substances from powdered drugs to facilitate

the microscopical examination of the cellular elements present, and could confirm him in recommending it. He had generally used treatment with acid followed by treatment with alkali, and had further cleared the tissues by solution of chloral hydrate. Cellular elements so prepared were exceedingly clear, and showed the details of structure, which were often very important, very clearly. The treatment with alkali should not be unduly prolonged, especially if the tissues were subsequently to be differentiated by staining, as it is liable to result in the tissues, particularly those that were only slightly liquefied, not responding to the usual tests as they should.

ANALYSIS OF PHARMACEUTICAL PREPARATIONS.

By J. E. Brunker, M.A. (Dublin).

As it may be of interest to the Conference to follow up the reports made in former years upon the results of examination of galenical preparations supplied to the Irish Medical Charities, I beg to submit the accompanying summary of the analyst's reports for last year.

The averages obtained are in close agreement with those observed hitherto, and represent supplies which were during the year of a more uniform character than usual. It will be found that the average alcoholic strength of tinctures is slightly higher than in the previous year, when it was affected by a cause which has since been removed.

It may be of interest to the Conference to learn that out of 9,455 samples of drugs examined during the year by the Union analysts, only 231 were rejected—an average of 2·43 per cent. Most of those were only defective in a very slight degree.

This indicates that medicines of uniformly good quality are supplied for the treatment of the sick poor in Ireland.

Table A.—Tinctures.

Tinctures.	No of. Samples.	Found Defective.	Extractive Grammes in 100 mils	Alcohol by Volume. Per Cent.
Aconiti	6	—	1·45	66·6
Asafetidæ	2	1	10·15	66·89
Aurantii	52	—	2·1	74·0
Belladonnæ	33	—	0·95	60·3
Benzoini Comp.	32	3	17·7	74·7
Buchu	43	1	4·0	57·0
Calumbæ	97	1	1·19	56·4
Camphoræ Comp.	466	7	0·39	58·6
Cannabis Indicæ	4	—	3·88	87·0
Cantharidis	7	—	0·25	87·4
Capsici	19	1	1·19	67·8
Cardamomi Comp.	114	—	7·06	56·0
Catechu	26	2	16·4	52·9
Chloroformi et Morphinæ	50	3	32·8	44·8
Cinchonæ	73	2	6·28	65·0
Cinchonæ Comp.	87	—	5·5	64·4
Colchici Seminum	6	—	3·31	43·4
Digitalis	155	3	3·79	55·1
Ergotæ Ammoniata	8	1	5·1	52·8
Ferri Perchloridi	154	7	—	22·6
Gelsemii	6	—	1·26	55·0
Gentian Comp.	238	2	5·56	43·4
Guaiaci Ammoniata	2	—	16·25	73·0
Hydrastis	11	—	2·27	57·2
Hyoscyami	101	8	3·36	43·4
Iodi	39	—	—	86·0
Jaborandi	6	—	3·56	42·3
Jalapæ	11	1	5·6	67·0
Kino	7	1	23·9	47·9
Lavandulæ Comp	16	—	0·57	88·3
Lobeliæ Ætherea	9	—	1·68	63·5
Myrrhæ	12	—	5·3	85·0
Nucis Vomicæ	153	13	2·6	63·1
Opii	158	4	3·87	43·15
Podophylli	8	—	3·5	87·5
Quininæ	23	—	3·85	73·5
Quininæ Ammoniata	54	—	—	54·0
Rhei Comp.	62	—	16·65	51·4
Scillæ	104	2	12·06	53·4
Senegæ	107	4	6·4	55·2
Sennæ Comp.	18	—	11·17	39·0
Stramonii	11	—	4·13	42·7
Strophanthi	6	—	0·66	68·6
Valerianæ Ammoniata	15	2	4·12	53·7
Zingiberis	54	—	0·53	88·4
Total	2,665	69	—	—

Table B.—Liquors.

Liquors.	No. of Samples.	Found Defective.	Extractive Grammes in 100 mils.	Alcohol by Volume. Per Cent.
Calumbæ Conc.	89	4	4·4	19·5
Hamamelidis	24	4	0·04	17·2
Iodi Fortis	22	4	—	72·7
Picis Carbonis	5	1	5·0	81·0
Quassiæ Conc.	68	3	0·36	20·0
Rhei Conc.	13	—	12·25	18·37
Sarsæ Conc.	13	—	11·36	20·6
Senegæ Conc.	58	—	12·14	22·8
Sennæ Conc.	10	—	13·13	20·6
Total	302	16	—	—

Table C.—Liquid Extracts.

Liquid Extracts.	No. of Samples.	Found Defective.	Extractive Grammes in 100 mils	Alcohol by Volume. Per Cent.
Cascaræ Sagradæ	264	13	23·6	18·5
Ergot	83	6	15·6	31·0
Glycyrrhizæ	21	4	42·27	18·4
Opii	8	—	3·2	18·0
Total	376	23	—	—

Dr. Walsh said that Mr. Brunker, in his official capacity as assayist of the drugs supplied to the poor law unions of Ireland, examined a large number of specimens, as samples had to be supplied to him from all the unions in Ireland. For some years past Mr. Brunker had been supplying similar tables to this Conference, and he (Dr. Walsh) was sure that the more of such tables were supplied the better it would be for analysts who required to consult them. He called attention to the fact that Mr. Brunker's average of the extractive found in the thirty-two samples of Tinct. Benzoin Co. (17·7) was very close to that given by Mr. Liverseege in his paper read that morning, namely, 18, regarding which there was some discussion.

Dr. Symes said they were indebted to Mr. Brunker for putting before the Conference these particulars. These drugs were supplied to public institutions under competitive tenders, and it was very satisfactory to find that under these circumstances they were of such good quality. It was shown by Mr. Brunker that reliable articles had been supplied, although at a low cost, which fact spoke well for the integrity of the contractors.

SOME RECENT CHEMICAL DISCOVERIES IN THE EUCALYPTS.

By Henry G. Smith, F.C.S.

Assistant Curator, Technological Museum, Sydney, Australia.

Perhaps no genus of plants is so rich in distinct chemical constituents as is that important section of Australian trees, the Eucalytpus, and in no group is the determination of these constituents more helpful in the botanical arrangement and classification of the several species. The morphological arrangement of the members of the several sections from dried material alone seems altogether insufficient to point out with sufficient distinctness, for future reference, the peculiarities which should serve as characteristic marks of difference between the several species. The knowledge obtained by the chemical investigation of the plant aids considerably in this determination of doubtful species, and often fixes as distinctive characters what might be considered as of little consequence morphologically.

The knowledge thus gained is also of considerable economic value, and as each well-defined species appears to give always the same chemical constituents, under whatever conditions of growth (and much effort has been expended to decide this point), it is apparent how useful, both botanically and economically, such an investigation must be. This aspect of the question impressed itself upon my colleague (Mr. R. T. Baker, the Curator) and myself early in our researches on this genus, and to enable us to arrive at any concordant results we were forced to adopt a phyto-chemical method of determination. It was by this method of investigation that we were able to point out the co-relation between the venation of the leaves of the several species and the chemical constituents of the plant (see *Proc. Royal Soc., N.S.W.*, October, 1901 ; and *Research on the Euca-*

lypts, Baker and Smith, Sydney, 1902; in both of these works plates are given to illustrate this point). Not only does this apply to the oil obtainable from the leaves, but also to the kinos or astringent exudations. At present our methods for discriminating between the exudations of the several species are not sufficiently delicate to mark individual species, although the groups are very well differentiated.

These differences are not accidental, but the outcome of a well-defined process of evolution, and so constant have the characters been found to be, that in the paper above referred to it was possible to suggest, from the study of the botanical characters of a tree growing nearly 3,000 miles away, what the chemical constituents of the plant would be, and a subsequent investigation has completely supported that original suggestion.

The Kinos or Astringent Exudations.

One aspect of this question particularly interesting to pharmacists is that by running down the genus, species are found exuding kinos which do not gelatinize in tinctures. (See paper on this subject, *Proc. Roy. Soc., N.S.W.*, August, 1904.) It is absolutely necessary, however, that the product be obtained from the species named, and not from mixed species. The best product, chemically, is that from *E. microcorys*, but it cannot be obtained from this species in commercial quantities. The next best kind is that of *E. calophylla*; this species exudes kino in large quantity, and it can be supplied in ton lots if required. The product of *E. rostrata* is not so good, as it gelatinizes eventually, and is not nearly so astringent. A method has been devised for determining the rate of gelatinization of kino in tinctures by the use of commercial formalin.

The explanation for this peculiarity is that there are two (if not three) well-defined tannins in these kinos. One of these gelatinizes in tinctures more readily, perhaps, than does any other tannin. This is characteristic of the kinos of those eucalypts known as the "stringy-barks," the "peppermints" and a few others, and also occurs as a tannin glucoside in the kinos of the "iron-barks" and allied species (see paper *Roy. Soc., N.S.W.*, June, 1904). This tannin is coloured violet by ferric chloride. The glucoside was long supposed to be gum, but gum does not occur in the eucalypts. The other tannin does not gelatinize in tinctures; this is coloured green by ferric chloride;

but it is difficult to find it occurring sufficiently free from the other tannin to form a non-gelatinizable kino, and in only a few species does it occur in this condition. It appears to me, however, that pharmacists need not be troubled any more with gelatinized tincture of kino, and no glycerol or other corrigent is needed in its preparation.

The evolutionary process of the genus is marked in another direction by the kinos. In some of the early members the crystallizable body found in the kinos is aromadendrin alone, but soon another crystallized body introduces itself; this is eudesmin, and although eudesmin continues to increase as the genus descends, until it is found in considerable amount in some species known as "boxes," yet the other body, aromadendrin, is always present, although but in small amount, it thus continues throughout the whole genus by species exuding kinos containing crystallized bodies. A very large number of species, however, exude kinos which are quite free from any crystallized body. A remarkable circumstance connected with these bodies is that the colour reaction given with concentrated nitric or sulphuric acids are quite opposite—a yellow colour is given by nitric acid with one body and red with the other, and just the opposite with sulphuric acid, so that it is possible to determine the absence of either aromadendrin or eudesmin the one from the other. I have succeeded in devising a method of separation, in a perfectly pure condition, when they occur together in any kino, and purpose continuing their investigation.

Oxalic Acid.

It seems possible that oxalic acid may be obtained very cheaply as a by-product from the barks of certain species of eucalypts, where it occurs as calcium oxalate, as much as 16 per cent. being present in some species (see paper *Proc. Roy. Soc., N.S.W.*, May, 1905). It probably could not be profitably extracted from species containing no other commercial constituent, but in the bark of *E. salubris* a considerable amount of a tannin is present which has excellent tanning qualities, quite equal, if not superior to that of the "mallet," *E. occidentalis*. This could readily be extracted, as the bark is easily powdered, and, when evaporated down, would make an excellent tanning extract. From the residue the calcium oxalate could be extracted by dilute hydrochloric acid, precipitated by am-

monia, and the impurities removed (if necessary) by acetic acid. A comparatively pure product is thus obtainable, from which oxalic acid could be prepared by the usual methods. Scientifically, this discovery is interesting, as it probably accounts for the origin of the "mallees" or shrubby forms of the eucalypts, this being due to the poisoning effect of a continually increasing amount of oxalic acid in the plant. That this is so is suggested in many ways, particularly the close resemblance of *E. salmonophloia* of West Australia to *E. oleosa* of New South Wales, where it often grows as a "mallee," and to the presence of abundance of calcium oxalate in the barks of well-defined "mallees" as *E. gracilis*, *E. Behriana*, *E. dumosa*, etc. This "mallee" form is perhaps a stage in the ultimate extinction of the species. Again, it is only those species which have peculiar chemical and botanical characters that appear to form "mallees," and the "peppermints" and the "stringybarks" do not seem to take on the "mallee" form of growth, and these trees are allied to the largest eucalypts on the Continent. (See original paper for further information on this point.)

The Oils.

It is perhaps unnecessary to refer at any length to the ordinary eucalyptol oils of this genus now used in pharmacy except to suggest that it might be possible to raise the standard for a minimum amount of eucalyptol in the oil, and to insist that all medicinal oils be rectified. By an improved method of first distillation, and by collecting the more volatile products alone, a considerably improved oil is obtainable, much richer in eucalyptol and almost free from the higher boiling and more objectionable bodies.

The utilization of the terpene oils in other directions than in pharmacy will bring into use a practically unlimited supply of these oils, from species largely distributed throughout Australia; they will, however, become of less interest to the pharmacist. Not so the perfumery oils. The recent discovery of limonene (60 per cent.) in the oil of *E. Staigeriana* (*Pharm. Journ.*, May, 1906), together with citral (16 per cent.), and geraniol (12 per cent.), makes this oil of possible use as a flavouring agent, or in other directions; and the discovery of geraniol in large amount in the oil of *E. Macarthuri* (*Proc. Roy. Soc., N.S.W.*, November, 1900), where it occurs in amount not less than 60

per cent. of ester, and often reaching 73 to 74 per cent. of ester, makes this species of some importance as a source of geranyl-acetate, if not of geraniol itself, as the ester is entirely saponified in the cold by an alcoholic solution of potash.

The aldehyde citronellal has long been known as the principal constituent of *E. citriodora*, but a new aldehyde has recently been isolated from several eucalyptus oils. This has a very high lævorotation; it has been named aromadendral. It was originally thought to be cumin aldehyde. It is a common constituent in the oils of the "boxes" and allied species, and causes these oils to be lævorotatory, the terpene phellandrene not occurring in the oils of this group. The aromadendral extracted from the oil of *E. salubris* had a very high left rotation. (See papers, *Proc. Roy. Soc., N.S.W.*, December, 1900, and *Pharm. Journ.*, September, 1905.)

The constituent which gives the odour of peppermint to many of these oils has been isolated, as has also the constituent which is the source of the amyl alcohol found in eucalyptus oils.

It can thus be seen how numerous are the definite constituents obtainable from the several species of what is, perhaps, the most wonderful group of trees known, and also how interesting their deeper study has become.

Much more work is necessary, and a great deal of patient investigation also, before we can hope to claim such an intimate knowledge of their principal characters and peculiarities as is desirable, and before their economics can be thoroughly understood.

The President reminded his hearers that Mr. Smith was an authority on the chemistry of the eucalypts. Speaking of the Australian kind, he doubted whether we could be sure that the kino obtained from eucalyptus would be consigned to us unmixed.

NOTES ON SOME OF THE LIQUID EXTRACTS.

By D. B. Dott, Ph.C.

In looking over the processes prescribed in the British Pharmacopœia for the preparation of the principal liquid extracts one cannot fail to be struck by the variety of the official methods.

Belladonna is treated to a limited percolation with a special strength of alcohol (nearly 80 per cent. by volume), no evaporation being allowed, and therefore no provision made for the case of the extract being under the required strength. Cinchona is extracted by a mixture of water, acid and glycerin, a little alcohol being added when the strength is adjusted after evaporation. Ipecacuanha is percolated first in its natural acid state with 90 per cent. spirit, lime being afterwards added, and the percolation continued with strong spirit. Nux vomica is exhausted by 70 per cent. alcohol. If we take into account the less important liquid extract of hydrastis with 45 per cent. alcohol, and taraxacum with spirit, followed by water, the variety is further extended. Now, there could be no objection to this multiplicity of method (however puzzling to a student) if a real advantage were in each case gained. I am to maintain that this complication is unnecessary and, on the whole, to be deprecated. I would use 60 per cent. alcohol, with simple percolation, or maceration and pressure, as required, in nearly every case.

Belladonna root is more readily exhausted by 60 per cent. than by 80 per cent. alcohol. The powder, being of a bulky, spongy nature, does not favourably lend itself to repercolation. It is better to macerate and press.

Cinchona bark is much more readily extracted by 60 per cent. spirit than by the official menstruum. In this case it is well to add 1 per cent. hydrochloric acid with the first maceration, distil off the spirit, and make up to the volume indicated by the alkaloidal assay, using one-tenth volume of glycerin and one-fifth volume of alcohol.

Hydrastis rhizome is better extracted by 60 per cent. alcohol than with the official 45 per cent. Sixty per cent. is used for the tincture.

Ipecacuanha readily yields its alkaloids to 60 per cent. alcohol. The treatment with lime is in this method wholly superfluous. After practical exhaustion with 60 per cent. spirit, addition of lime and percolation with strong spirit gave the merest trace of alkaloids.

Nux vomica, when in a properly prepared coarse powder, gives up its alkaloids as readily to 60 per cent. as to 70 per cent. alcohol, and with the distinct advantage that less oil is extracted by the weaker spirit.

In all the above cases the corresponding tinctures may con-

veniently be made by dilution of the liquid extract with 60 per cent. alcohol.

It is not practicable to adopt a uniform method of alkaloidal determination, yet the present processes may with advantage be simplified and brought more into line. Some of the peculiarities in assay processes are rather in the nature of fads. All the alkaloids (or, at least, all the more important) in the extracts referred to are easily dissolved out by a mixture of chloroform and ether, so there is no need for varying the solvent employed. In the instances of belladonna, cinchona and ipecacuanha, the alkaloids can be well enough estimated by titration with standard acid. The difficulty that the different alkaloids in the same extract have not the same molecular weight is more a theoretical than a practical objection. A mean weight derived from the proportions of alkaloid probably present is sufficiently accurate. In the case of nux vomica, the modification of the nitric acid method devised by Farr and Wright gives excellent results. We have carefully compared it with the process presently official, and find the results very concordant. As the Farr and Wright method is less liable to error, and can be completed in a much shorter time than the ferrocyanide process, there can be little doubt that it will supersede the present official process. It is probably not necessary to determine the amount of total alkaloids, but should it be considered desirable to do so, that may easily be done without a separate analysis.

The PRESIDENT said there was much food for thought in the paper which had just been read. They were all practical pharmacists making preparations on a large or small scale, and, therefore, the points discussed by Mr. Dott were of the greatest importance to them.

Mr. CRIPPS said he agreed with the author that weaker alcohol was preferable for extraction of ipecacuanha and also that lime was unnecessary. He, however, disagreed with Mr. Dott in regard to the extraction of belladonna, because the use of the weaker spirit entailed the solution of a greater proportion of "extractive" relative to "alkaloids," and the resulting liquid extract became unsuitable for use in preparing the ointment or plaster by official methods. Provided that the belladonna root has been selected with discretion, there is no need for concentration. Mr. Cripps objected altogether to the use of a spirituous

solvent for liquid extract of ipecacuanha, because he had found an acetic extract prepared by a modification of the 1885 B.P. process to give a much more satisfactory wine for which purpose the liquid extract is required.

Dr. Symes considered the suggestion to reduce the strengths of the menstrua to two strengths was retrograde. Drugs of a complex character could not be properly and economically exhausted by proof spirit and rectified spirit. He thought the menstrua should be chosen having in view the particular requirements of the preparation to be made from the drug.

Mr. Alcock was of opinion that the present-day extracts were made too strong and the tinctures too weak in amount of the drug. When both extracts and tinctures made according to the 1898 B.P. were kept there was a heavy sediment, while in those of the 1885 B.P. there was practically little sediment, and this, he believed, was owing to the lowering of the strength of the alcohol. He agreed with Mr. Dott's suggestion with regard to the extraction of hydrastis rhizome.

Mr. Gerrard said the choice of solvent should be ruled by the circumstances; the solvent which was suitable for one drug might not be best for another. He agreed that the methods of estimation should be simplified.

Mr. Lothian wanted some guarantee that standardized extracts were really made from the pure drug.

Mr. Dott replied on the discussion.

NOTE ON AMMONIATED MERCURY.

By Thomas Tyrer, F.I.C., F.C.S.

All will agree that looseness of definition or want of clearness in description may be sources of trouble and probably harm. Nowhere are these defects more indefensible than in the Pharmacopœia which, rightly or wrongly, is gradually being regarded as the legal standard to which drugs and medicaments should conform. The formula $HgCl{\cdot}NH_2$ is that on which evidently the percentage of mercury is calculated. It is not founded on experimental work. The B.P. gives 78 to 79 per cent. as the yield on "being heated with excess of lime." Apart from the defects of this method of estimation, it has been clearly shown by Chas. T. Tyrer, before this Conference in 1901, as the result of experience since 1893–4; also by Umney and Bennett, in

The Pharmaceutical Journal, November 24, 1900, and later by Bernard F. Howard in a paper before the Society of Chemical Industry, February 29, 1904, that estimation by hyphosphorous acid was reliable, and could well be adopted as official. The result of these observations is to show that commercial and saleable samples may legitimately vary between 75·50 per cent. and 77·32 per cent.

The reason for this variation is in all probability due to the presence of ammonium chloride, which is found in all commercial ammoniated mercury. This leads to the point of this note—namely, the direction in the B.P. that the precipitate should be washed well with cold distilled water "until the liquid which passes through is free from chloride." There is here no allowance for commercial conditions—for which possibly compilers of pharmacopœias care little—but there is no regard for the well-recorded fact that ammoniated mercury is distinctly an unstable body, undergoing decomposition by prolonged washing by quite moderate heat and by exposure. In consequence of attention being drawn by a correspondent to the presence of chloride (water soluble), some ammoniated mercury was made under B.P. conditions. Washing was continued as directed with negative results as regards the absence of chlorine and an increasing deterioration of the colour of the precipitate.

One gramme of the dried salt was digested with frequent agitation for two hours with 1,000 mils of distilled water. One gramme was similarly treated with 100 mils of water. The 1,000 mils digestion gave chlorine equal to 13·2 mils of N/10 silver nitrate solution. The 100 mils gave chlorine equal to 4 mils of N/10 solution, proving that the decomposition varied with the amount of water employed. Further, 2 grammes of salt was extracted on a filter with successive quantities of 10 mils of cold distilled water, with the following requirements of N/10 silver solution.

Washing No.	Required Mils N/10 Solution.	Washing No.	Required Mils N/10 Solution.
1	1·3	11	0·8
2	1·7	12	0·7
3	1·7	13	0·7
4	1·7	14	0·7
5	1·5	15	0·6
6	1·4	16	0·5
7	1·5	17	0·4
8	1·7	18	0·4
9	1·3	19	0·4
10	1·0	20	0·3

Long before the conclusion of these washings the salt had become distinctly yellow, which, when dried, would have rendered it unsightly and unsaleable.

One's object is to procure that the definitions of the B.P. shall be reasonable and practicable standards under commercial conditions. In the case of ammoniated mercury there is a contradiction. The *modus operandi* details that the washing should continue until the liquid is free from chloride. The characters and tests say: "A white powder on which water has but little action."

It is clear from the experimental data given that both cannot be right. All the evidence points to the reasonable mercury percentage of 76 to 77. As to freedom from chloride, there is in this case at least justification for the use of the word "slightest," for the presence of chloride due to perchloride is governed by the ether and alcohol tests. One may add that correspondence with Messrs. Howards & Sons, of Stratford, confirms these conclusions. We hope to make definite the "indefinite" among the non-galenical preparations before the next meeting of the Conference.

The PRESIDENT having made a brief reference to the paper, Mr. E. WHITE agreed with the author's conclusions. He thought Mr. Tyrer was rather hard on the B.P. authorities, but now that this paper had appeared it was probable that some effect would be produced on the compilers of the volume.

THE DETECTION OF CITRATES AND TARTRATES.

By J. F. TOCHER, F.I.C.

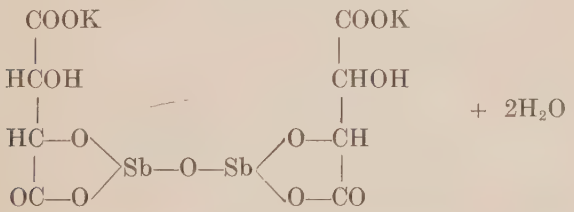
In carrying out the separation of nickel and cobalt by means of alkaline tartrate, the bright colour and sparing solubility of tartrate of cobalt were noted. Nickel salts undergo no intensification of colour on the addition of a tartrate. If, instead of passing H_2S through the solution, excess of alkali [1] is used, the colour of the cobalt tartrate is discharged, and a clear solution is obtained if cobalt alone be present, while a greenish precipitate and green solution are obtained if nickel alone be present.

[1] Soda or potash, but not ammonia.

The intense colour of cobalt tartrate and the non-precipitation of the hydrate by alkali in presence of tartrates attracted the author's attention. On boiling the alkaline tartrated cobalt solution, a deep blue colour was developed, which disappeared on cooling and reappeared on again warming the solution. The behaviour of citrates is different. On adding excess of alkali to a mixture of an alkaline citrate and a cobalt salt, a deep blue solution was immediately produced. Since the colour of cobalt hydrate, freshly precipitated, is a deep blue, the inference seems fair that no hydrate is formed when excess of alkali is added to cobalt tartrate in the cold, but that, on boiling, it is formed and is kept in solution by the presence of both alkali and alkaline tartrate. On the other hand, bearing in mind that the hydrated salts of cobalt are reddish and the dehydrated salts are of a blue colour, there is the possibility of a dehydrating action being exerted in the solution when warmed. This explanation is applied to the intensification of colour produced by warming a cobalt salt with strong hydrochloric acid.

The effect of an alkaline cobalt solution on tartar emetic was noted, and the result adds weight to the belief that this compound is not strictly a tartrate. A deep blue solution is produced immediately in the cold, thus giving the same reaction as citrates do. The high rotatory power [1] of tartar emetic, its cryoscopic [2] value and other considerations tend to prove that the constitution of tartar emetic may be somewhat as follows—

VAN 'T HOFF'S FORMULA.



that is to say, tartar emetic is a tartrantimoniate of potassium.[3]

The behaviour of twenty-eight inorganic acids with the alkaline cobalt reagent was noted, and in no case was the reaction similar to either the tartrate or citrate reactions. The deep

[1] Landolt. [2] *Zeitschr. Physik. Chem.*, 9, 484.
[3] Attfield and Dobbin describe it as such.

blue cobalt silicate appears to undergo no change on the addition of alkali, but on boiling becomes light purple in colour. The blue cobalt phosphate forms a whitish solid gelatinous mass, with fairly concentrated solutions of soda. Cyanide of cobalt changes from purple to darkish ppt. and a coloured solution. Persulphate of ammonium and permanganate of potassium both yield the jet black, scaly precipitate of cobaltic-cobaltous oxide. The inorganic salts of cobalt are noted for their colours. The general effect of adding excess of soda solution is to precipitate the blue hydrate, this precipitate changing on shaking or on boiling to various dirty-coloured hues. The action of cobalt and alkali on fourteen organic acids was noted : acetic, citric, oxalic, succinic, formic, valerianic, tartaric, gallic, tannic, benzoic, salicylic, malic, lactic,[1] and carbolic acids being those operated on. Their behaviour was similar to that of the inorganic acids, bluish precipitates being formed on adding excess of alkali to the mixture of cobalt and acid, with the exception of gallic, tannic and carbolic acids, which gave a purple solution, a wine-red precipitate, and a greenish precipitate respectively, and of malic acid, which gives a blue solution in the cold similar to what citric acid does. Succinic acid does not give the tartrate or citrate reaction. Since tartaric, citric, and malic acids are all hydroxy-carboxylic acids, their behaviour with cobalt and alkali seems to have some connexion with the hydroxyl groups in these compounds, as may be seen from an inspection of their formulæ. The reaction has no connexion with the asymmetry of the molecules, since optically inactive racemic acid gives precisely the same reaction as the dextro-tartaric acid used, while malic acid is optically active and citric acid is inactive, and both these act similarly with the reagent. Since malic acid is distinguishable from citric acid in a variety of ways, the properties of the malates of lead, calcium and ammonium being prominent, their similar behaviour with cobalt and alkali merely serves to group them for more ready identification.

The following table may prove useful to students and others interested in qualitative analysis.

[1] Lactic acid (hydroxypropionic) gave a gelatinous blue precipitate, changing to green on shaking and to brownish on boiling.

TABLE FOR TARTRATES, CITRATES AND MALATES.

Concentrated Sulphuric Acid and Heating gives—		
A Charred Mass. Tartaric Acid.	A Yellowish Solution. Citric Acid.	A Dark Solution. Malic Acid.
Add a few mils of cobalt nitrate solution and then excess of solution of sodium hydrate.		
A fine red solution is formed on adding cobalt nitrate, which is discharged to a clear solution by sodium hydrate. On boiling a deep blue solution is produced, which fades away on cooling. =Tartaric acid.	A deep blue solution results. —— A precipitate is produced on boiling neutral solution with calcium chloride. —— =Citric acid.	A deep blue solution results. —— No precipitate on boiling neutral solution with calcium chloride. —— Heat small portion with dilute sulphuric acid and potassium dichromate. Odour of ripe fruit =Malic acid.

THE ACTIVITY OF PEPSIN AFTER BRIEF CONTACT WITH CERTAIN INORGANIC COMPOUNDS.

BY J. F. TOCHER, F.I.C.

Enormous additions have been made in recent years to our knowledge of the proteids, both from the chemical and physiological standpoints.[1] A full knowledge of the nature and properties of these important animal products and their derivatives is, however, possessed only by the specialist, who hopes soon to determine the constitution of most of the substances of this complex group. The provisional constitutional formula for albumen is very interesting and suggestive. On the other hand, pharmacists and medical practitioners are more concerned with such facts as apply practically to their own work, and the present note is chiefly of value, because, while not devoid of theoretical aspects, it indicates the erroneousness of mixing pepsin with alkali in any form, and however dilute.

While it is quite generally understood that pepsin requires a suitable acid medium in order to act as a proteolytic agent, it is not clear that many of us are as aware as we ought to be of the delicate nature of the enzyme or of its readiness to change when mixed with other substances.

[1] *Chemistry of the Albumens*, Schryver, 1906; *Chemistry of the Proteids*, Mann, 1906.

In view, however, of the fact that pepsin is largely used in admixture with all sorts of compounds, it seems worth while inquiring whether the enzyme retains its activity in these mixtures. A favourite combination for dispensing purposes is that containing morphine, strychnine, hydrocyanic acid and bismuth solution in some form, formulæ for which may be found in any of the authorities on dispensing, while mixtures of a similar composition are sold by firms of repute. One of these on examination gave no proof of the presence of pepsin, while another well-known make contained such a minute quantity as to indicate that most of the enzyme [1] had been destroyed by contact with the ingredients of the mixture. The erroneous view that pepsin is a sturdy drug and can be mixed with anything seems to be held in some medical quarters. Prescriptions containing sodium bicarbonate and a solution of pepsin—written in the apparent belief that the properties of both could be utilized in admixture—have recently been dispensed. An alkaline mixture was recently declared by a medical practitioner in the witness-box to be the combination he desired along with an acid solution of pepsin, and on cross-examination he stoutly upheld his view, although the likelihood of the pepsin being destroyed was presented to him.

Pepsin in contact with sodium bicarbonate [2] for some hours has been shown to have its proteolytic power destroyed. Many neutral salts, alkaloidal and other substances have been shown to have a retarding influence on pepsin, while digestion with strong alkali has been found to destroy the enzyme completely. The effect of very dilute alkaline solutions on pepsin does not appear to have been determined, and, in view of the somewhat indiscriminate use of the enzyme, seems worth a little study.

Scale pepsin, with a declared and real proteolytic value of about 2,500, was used in this investigation, solutions containing 1 Gm. pepsin in 1,000 mils were freshly prepared for each set of experiments. The strength of acid (HCl) used was exactly 0·2 per cent. The proteid used was coagulated egg albumen, and the activity of the pepsin was determined by the amount of albumen undissolved. As will be seen from the results of the experiments, what one had chiefly to note was the action or non-action of the enzyme. Several experiments with fibrin, dry egg

[1] It is extremely doubtful that such slight change as occurred was due to pepsin.

[2] Wroblewski, Schweitzer, Bardet, and others.

albumen and casein were carried out, the fibrin and casein being weighed, or the peptones separated and weighed, as the case may be, with no material advantages.

The first series of experiments was carried out on $NaHCO_3$, NaOH and KOH solutions, the time of contact- in the cold—prior to digestion varying from one hour to seventy-two hours. The proteolysis was carried out in a Hearson's incubator at 40·5°C., that temperature being easily and exactly maintained during the whole course of the investigation. Control parallel experiments were carried out, using merely pepsin, albumen and acid solution. After contact with the pepsin for the period of time desired, the alkaline pepsin solution was neutralized, then added to 125 mils of HCl (0·2 per cent.) containing 12·5 Gm. albumen, and the mixture placed in the incubator for digestion. Control experiments for the purpose of noting any inhibitory effect exerted by sodium or potassium chloride were carried out, the alkali being neutralized by hydrochloric acid prior to the addition of the pepsin.

The following results were obtained—

TABLE I.

No.	Volume of Pepsin Sol. used in mils.	Weight of Pepsin in Milligrams.	Weight of Foreign Substance introduced.	Time of Contact. Hours.	No. of hours' Digestion.	Mean Weight of Albumen Undissolved.	Standard Deviation.
						Gm.	
I. 1–5	5	5	0·548Gm.$NaHCO_3$	1	6	11·02	0·585
II. 6–10	5	5	,, ,,	4	6	11·16	0·627
III. 11–15	5	5	,, ,,	8	6	10·78	0·491
IV. 16–20	5	5	,, ,,	72	6	11·31	0·507
V. 21–25	5	5	0·585 Gm. KOH	1	6	11·28	0·554
VI. 26–30	5	5	0·4 Gm. NaOH	1	6	10·97	0·601
VII. 31–35	5	5	—	—	6	11·22	0·546

The foregoing results show that practically no action had been exerted on albumen by pepsin after contact with the foregoing alkalies, and that as much albumen remained undissolved after long contact as with short contact. Experiments 31–35 (VII.) are control experiments, the albumen being weighed again after addition to the acid solution. The error is of the same order, as is shown by the standard deviation, and a consideration of the probable errors.

The effect of very dilute solutions of ammonia and soda in brief contact was now studied. Quantities varying from 1 mil upwards of decinormal solutions were added successively to solutions of pepsin containing 0·005 Gm. The mixtures were immediately neutralized, brought into contact with the proteid mixture and placed for digestion in the incubator. The following table (Table II.) shows that the *enzyme is completely and immediately destroyed in contact with free alkali in dilute solutions.* That is to say, taking the weakest alkali solution used, 1 mil decinormal ammonia or soda (containing 0·0017 Gm. NH_3 or 0·004 Gm. soda) was sufficient to destroy the proteolytic power of 5 Mgm. of pepsin. The results from slightly stronger solutions of both alkalies only confirm this result. The importance of this result cannot be overlooked. It is the practice in preparing certain bismuth and pepsin mixtures to use a solution of bismuth, which in practical experience is always distinctly alkaline. Besides, for the purpose of making an elegant-looking preparation, an alkaline solution of carmine is used. These facts supply the reason why there is no proteolytic power in popular compounds of bismuth and pepsin. The enzyme is destroyed by ammonia.

TABLE II.

Nos.	Weight of Pepsin Used.	Quantity of Alkali Introduced (Decinormal Solution).	Weight of Albumen Undissolved.
1–10 .	5 milligrams	1 mils NH_3 sol. N/10	11·22 Gm. (mean)
11–20 .	,,	1 ,, NaOH sol. N/10	10·97 Gm. (mean)
21 .	,,	2 ,, NH_3 sol. N/10	11·21 Gm.
22 .	,,	3 ,, ,,	10·76 Gm.
23 .	,,	4 ,, ,,	11·06 Gm.
24 .	,,	5 ,, ,,	11·43 Gm.
25 .	,,	2 ,, NaOH sol. N/10	11·27 Gm.
26 .	,,	3 ,, ,,	11·25 Gm.
27 .	,,	4 ,, ,,	11·48 Gm.
28 .	,,	5 ,, ,,	11·78 Gm.

Using the same quantities of pepsin, acid and proteid, various volumes of Easton's Syrup, morphine, compound infusions of gentian, calumba and quassia, and glycerin were successively introduced to separate mixtures. None of these mixtures had any retarding effect on the activity of pepsin, except morphine,

the albumen being converted into peptone at about the same rate as in the control experiment.

The behaviour of the salts of bismuth towards pepsin was observed—the subnitrate and subcarbonate being used—and seems worthy of notice. To a number of tubes containing 10 mils of 0·1 per cent. solution of pepsin, 0·5 Gm. quantities of the subnitrate and carbonate were successively added and each tube shaken. After twenty-four hours the supernatant fluid in each was carefully poured off into the albumen mixtures, the solid deposits being placed in separate ones. The whole series was digested for six hours with the following result—

TABLE III.

—	Weight of Pepsin introduced in Gm.	Weight of Substance introduced in Gm.	Weight of Albumen undissolved in Gm.	Weight of Albumen dissolved in Gm.
Solution, 5 experiments	0·01	$0·5BiONO_3$	—	12·5
Deposit „		—	12·5	—
Solution „	0·01	$0·5Bi_2O_2CO_3$	12·5	—
Deposit „		—	—	12·5

Thus, while shaking the solution of pepsin with subnitrate of bismuth and subsequent sedimentation had no effect on the activity of the pepsin (which remained in solution), similar contact with the carbonate brought down the pepsin, on sedimentation, without affecting its proteolytic power. In other words, if the pepsin is not combined chemically with bismuth, bismuth carbonate acts as a precipitant of the enzyme, like sulphate of ammonia and certain other salts, while the subnitrate has no such action. It might be expected at first sight that bismuth carbonate would be acted upon by hydrochloric acid, reducing the acid strength of the solution, and thus preventing the proteolysis from taking place. This, however, does not happen because of the weakness of the acid solution. A much higher degree of concentration is necessary for the interaction of bismuth carbonate and hydrochloric acid solution.

SUMMARY.

1. Solutions of sodium bicarbonate, sodium, potassium and ammonium hydrates when added to solutions of pepsin in the

cold have an immediate inhibitory or destructive effect on pepsin, according to the concentration. In ordinary concentrations the effect is to destroy the enzyme immediately.

2. Dilute solutions of caustic alkali immediately destroy the activity of dilute solutions of pepsin. One mil of decinormal ammonia (0·0017 Gm. NH_3) is quite sufficient to destroy the proteolytic power of 5 Mgm. of pepsin in 10 mil of water. That is, a 0·1 per cent. solution of pepsin with an alkalinity equal to 0·017 per cent. has no proteolytic power whatever. On acidifying and digesting, the enzyme is found to be destroyed. Pepsin should therefore never be prescribed with alkalies.

3. Carbonate of bismuth precipitates pepsin from aqueous solutions; subnitrate of bismuth does not.

4. Compound mixtures containing solution of bismuth, morphine, carmine, etc., should contain no pepsin, since the activity of the enzyme is much retarded by the morphine and is destroyed proportionally to the amount of alkali present in solution.

Mr. J. R. Hill said the questions dealt with in this paper were of especial importance, and commended it not only to the notice of pharmacists but also to medical practitioners. In the case alluded to by Mr. Tocher, expert evidence was adduced to prove that it was in accordance with the practice of medicine to prescribe pepsin in an alkaline medium. That was true if the pepsin and alkali were taken before food, because the alkali was absorbed and stimulated the peptic glands, causing an increased secretion of the acid gastric juice, in which the pepsin became active. In the case in question, however, the mixture was ordered to be taken after food, and there could be no doubt in such circumstances the proteolytic function of the pepsin was entirely lost, and the combination was quite unscientific. The author's results entirely confirmed an opinion he (Mr. Hill) had entertained for some time, namely, that the pepsin in all these alkaline mixtures was absolutely destroyed and useless. He had recently examined a number of commercial compound bismuth mixtures in extensive use, and found that the percentage of free ammonia varied from 0·12 to 0·30. This was largely in excess of the amount required to completely destroy the proteolytic action of the pepsin. He had also observed in examining commercial samples of liquid bismuth that many contained

much more than the slight excess of free ammonia permitted by the Pharmacopœia.

GENERAL BUSINESS.

Vote of Thanks to *The Pharmaceutical Journal.*

The President thought it was quite clear that those present were glad that after so many hours of serious consideration and close deliberation the scientific papers had now come to an end. But they would admit in all seriousness that they had had a most useful set of papers placed before them for their consideration, and he was extremely happy to feel that they had had sufficient time to deal with them, and that they had discussed them thoughtfully, deliberately and, they believed, with great advantage not only to themselves but also with satisfaction to those who had presented them. "We have come," proceeded the President, "to what is termed the general business, and to the closing scenes of the business portion of the Conference. The first thing which I desire to call attention to is this complete programme, which has been provided by *The Pharmaceutical Journal* through its Editor. When I say complete, you will note that it contains not only the list of papers, but also the financial statement for the year and the order of business. It has immensely facilitated our business, and I think we are greatly indebted to the Editor for providing us with the papers in this form, because it has materially assisted us in the discussion of the various contributions. I therefore propose that our best thanks be accorded to *The Pharmaceutical Journal*—and that, of course, includes the Editor—for providing this programme in this most convenient form."

Mr. Peck seconded the motion, and, speaking on behalf of the two secretaries, briefly endorsed the remarks of Mr. Naylor. He also thought that with that vote should be included an expression of thanks to the Pharmaceutical Society for granting them the use of a room for executive meetings. The proposition was unanimously carried.

The Bell and Hills Fund.

The President said the next business was the presentation of books from the Bell and Hills Fund, and, having explained

the origin of the fund, he called upon Mr. Gerrard, as representing the Midland Pharmaceutical Association, to accept the books, and remarked that he had no doubt the local association would find them of the greatest possible value as works of reference. The books are as follows—

U.S. Pharmacopœia.
German Pharmacopœia.
Greenish's *Microscopical Examination of Foods and Drugs.*
Hewlett's *Bacteriology.*
Luff's *Forensic Medicine and Toxicology* (2 vols.).
Remington's *Practice of Pharmacy.*
Bernthsen's *Organic Chemistry.*
Ganot's *Physics.*
Strasburger's *Botany.*

Mr. Gerrard said it afforded him very great pleasure to accept these volumes, not only on behalf of the Midland Pharmaceutical Association, but also on behalf of the chemists and druggists of the Midlands, because, so far as their Council were concerned, they could be used by those who were not members of the local Association, the idea being to encourage those who wished to gain knowledge in every way possible. They had about 500 books in their local Association's library, and those presented to-day would prove a welcome addition.

Place of Meeting for 1907.

Mr. Harry Kemp extended a very cordial invitation to the Conference to visit Manchester in 1907, and pointed out that twenty years ago he made his first acquaintance with the Pharmaceutical Conference at Birmingham, when he came as part of a deputation from Manchester to invite the Conference to hold their meeting at Manchester. His object that afternoon was to again repeat the invitation to visit Manchester. It would be useless for him to offer any inducements such as saying Manchester was an "ideal health resort," but he assured them the city was not so black as it was sometimes painted. While they could not claim the advantages of Brighton, where the Conference was held last year, he reminded them that Manchester was a city of industry, and they would have many things to show them which would interest them. The people of Manchester had been the pioneers of many things, and he cited as an instance the fact that the city was the first to

introduce a supply of pure water from a distance of ninety miles. If they accepted the invitation, he was sure they would receive a real North-country welcome, and they would go away with no regrets whatever, except that they had had to go away sooner than they would have liked.

Mr. KIRKBY seconded the invitation, and alluded to the fact that though they might not have many natural beauties to show them at Manchester, they would be able to show them something of its industries. He was sure that every pharmacist in Manchester would be only too pleased to place himself and his time at their disposal if the invitation was accepted.

Mr. PIDD said he could only say that if the Conference accepted the invitation, his services and that of every member of the executive would be devoted to making the visit very enjoyable.

Mr. JOHNSTONE supported the invitation, observing that they would be delighted to see them at Manchester. He spoke of the city's attractions, and specially dwelt on the University and Technical School.

Mr. WELLS formally proposed the acceptance of the invitation, and thought it had been proffered in most cordial terms. It was his privilege to attend the Manchester Conference nineteen years ago, and they were very well entertained and warmly received on that occasion—especially by the ladies! He did hope the Conference would accept the invitation, and expressed a few words in praise of the arrangements for the Birmingham meeting.

Mr. J. P. GILMOUR seconded the motion, and referred to the extreme friendliness and cordiality which distinguished the invitation.

The PRESIDENT: Is it your pleasure that the invitation to visit Manchester next year, which has been so cordially given, be as cordially accepted?

This was received with applause, and, turning to the Manchester friends, Mr. Naylor indicated formal acceptance of the invitation.

ELECTION OF OFFICERS.

Mr. HOBBS proposed the election of the following officers for 1906–7: President: Thos. Tyrer, F.I.C., F.C.S., London; Vice-

Presidents : R. A. Robinson, L.C.C., J.P., London ; D. B. Dott, F.R.S.E., F.I.C., Edinburgh ; Dr. J. A. Walsh, Dublin ; F. Ransom, F.C.S., Hitchin ; Henry G. Greenish, F.I.C., F.L.S., London ; G. S. Woolley, Manchester. Hon. Treasurer : J. C. Umney, F.C.S., London. Hon. General Secretaries : E. Saville Peck, M.A., Cambridge ; Edmund White, B.Sc., F.I.C., London. Hon. Local Secretary : W. Kirkby, Manchester. Other Members of the Executive Committee : F. H. Alcock, Birmingham ; H. Finnemore, London ; H. W. Gadd, Exeter ; A. W. Gerrard, Birmingham ; D. Lloyd Howard, London ; H. Kemp, Manchester ; W. H. Martindale, London ; J. F. Tocher, Peterhead ; Chas. Thompson, Birmingham.

Mr. HOBBS added that Mr. Tyrer was a gentleman of great standing and ability, and in saying to their retiring President that he had a successor who would act as worthily as himself, he was sure it was nothing derogatory to Mr. Naylor. Mr. Tyrer's name was a household word among them. The Hon. Secretaries had to do a great deal of work, and deserved every credit for the admirable manner they performed their various duties.

Mr. MATHER seconded, and added his tribute to the ability and suitability of Mr. Tyrer for the office of President.

The PRESIDENT having congratulated the Conference upon its choice,

Mr. TYRER rose to reply. He could only say "Thank you" for the kind words uttered, and promised to do his best for the Conference. He dwelt on the value of the co-operation of the Committee and officials.

VOTE OF THANKS TO THE LORD AND LADY MAYORESS.

Professor GREENISH, in a few well-chosen remarks, referred to the reception of the Conference by the Lord Mayor and Lady Mayoress on Monday, and moved a vote of thanks to Mr. and Mrs. Reynolds. The speaker's remark that the Lord Mayor's welcome to the Conference had started the meetings with an *éclat* which would otherwise have been impossible was received with acclamation by the audience.

Mr. LAKE seconded, and expressed the opinion that Birmingham was "a magnificent city, a healthy city, and a progressive

city." He gave an informal invitation to the Conference to visit Exeter in the year following the Manchester meeting.

Vote of Thanks to the University Authorities.

Mr. Dott proposed a vote of thanks to Sir Oliver Lodge for allowing the use of the University theatre for their meetings.

Mr. Stuart Hills seconded, and said that, though his thanks were short, they were none the less sincere.

The motion was unanimously carried.

Vote of Thanks to Local Committee.

Dr. Walsh moved a hearty vote of thanks to the local Committee "for the complete and admirable arrangements made for the comfort and enjoyment of the members."

Mr. White (Clifton) seconded, and

Mr. Barclay, in responding, expressed "the joy we have had in receiving you." They had had a grand Committee, and the ladies had rendered them good assistance, especially in the canvassing direction.

Messrs. Thompson, A. W. Southall and J. Poole also replied.

Dr. Symes (Liverpool), in eulogistic terms, moved that "the best thanks of the meeting be given to our very worthy President for the able manner in which he has filled the office and conducted the business of the Conference during the present session." He thought that Mr. Naylor had been an ideal President.

Mr. Tyrer seconded, and

The President suitably acknowledged the compliment.

This concluded the business.

THE SOCIAL GATHERINGS.

Monday, July 23.

Reception at the Council House.

On Monday evening, July 23, the members of the Conference and their friends were the guests of the Lord Mayor and Lady Mayoress (Councillor and Mrs. A. J. Reynolds) who held a reception in the Drawing-room of the Council House. The adjoining rooms of the Municipal Art Gallery were thrown open for the enjoyment of the visitors, to meet whom the Lord Mayor had thoughtfully invited a large number of distinguished Birmingham residents representative of Art, Medicine, Science, and the Civic life of the city. The various apartments were most tastefully decorated and their rich contents were highly appreciated by the visitors who assembled to the number of about six hundred. Refreshments were provided in one of the rooms of the Art Gallery, and a band played a selection of music at intervals. The evening afforded a pleasant opportunity for reunion amongst members of the Conference coming from various parts of the kingdom.

Tuesday, July 24.

Visit to Messrs. Osler's Glass Works.

On Tuesday morning, after the president's address, a carriage drive through the fine suburb of Edgbaston was provided for the ladies, visiting the Glass Works *en route*. Through the courtesy of the firm, the formation of high-class table-glass and the "cutting" process were shown, a large order for India being in hand at the time of the visit.

After luncheon parties were made up to

Visit the Cathedral and the Electroplate Works of Messrs. Elkington & Co.

Here the visitors were shown through show-rooms, modelling and plating departments, while in the designing departments the artists were seen at work.

Visit to Coventry.

After the conclusion of the afternoon sessions the members of the Conference assembled at New Street Station, where a train was in waiting to convey them to Coventry. Here carriages were in readiness and, after driving through the picturesque streets of the town, the party arrived at the Charter House, the residence of Colonel and Mrs. Wyley, whose kindness in entertaining the Conference was highly appreciated. This visit to the Charter House, formerly the Prior's lodging in a Carthusian monastery founded in the reign of Edward III., afforded much pleasure to the visitors on account of the many objects of historical interest contained in the house and in its beautiful grounds. Tea was served in the grounds and the band of the 2nd Warwickshire Volunteers played on the lawn during the afternoon. After tea, the guests having assembled on the lawn, Mr. Naylor proposed a vote of thanks to the Host and Hostess, which was very heartily received and to which Colonel Wyley responded.

The party then drove to Kenilworth Castle through beautiful country and, after some time spent in inspecting the interesting remains of the historic building, returned by special train to Birmingham.

Smoking Concert.

Tuesday's proceedings concluded with a smoking concert at the Grand Hotel with Mr. T. Tyrer in the chair. Under his able guidance an excellent programme, arranged by the local Committee, was carried out.

Wednesday, July 25.

Visit to Bournville Model Village.

During the morning, under the guidance of members of the local committee, a large party visited Messrs. Cadbury's model village, which is situated about four miles south-west of Birmingham. The visitors were received by Mr. George Cadbury, who explained the origin of this village enterprise and the principles upon which it was founded, which considerably increased the pleasure derived from the inspection of the admirable arrangements visible on all sides.

Organ Recital.

In the afternoon an organ recital was given in the Town Hall

by Mr. C. W. Perkins. To the great regret of the many lovers of music who had assembled, the programme had to be curtailed owing to a mishap to the machinery.

Visit to New University Buildings, Bournbrook.

At 4.15 after the conclusion of the Sessions of Conference, a large party drove to inspect the new buildings of Birmingham University which are approaching completion. The original buildings are situated in Edmund Street, but the new buildings are being erected on 25 acres of land presented to the University by Lord Calthorp, distant about 3 miles from the centre of Birmingham. The main blocks, 10 in number, are arranged in a semi-circle, and five departments—chiefly engineering—are already in working order. Separate buildings are provided for a power station, model mine, foundry and forge. The visitors were received by the Pro-Vice-Chancellor, Alderman F. C. Clayton, J.P. The spacious buildings were inspected and much admired and, after tea, which had been provided by the kindness of Mr. Alderman Clayton, a vote of thanks was proposed by Mr. Thomas Barclay and seconded by the president, Mr. W. A. H. Naylor. Mr. Clayton, who was heartily received, in replying referred to his early connection with pharmacy, and assured his hearers that in the new University arrangements in the interests of pharmacy would not be overlooked.

Reception at the Botanical Gardens.

At 8 p.m., Mr. and Mrs. Thomas Barclay entertained the Conference at the Botanical Gardens, Edgbaston. The hospitality of Mr. Barclay was also extended to over two thousand of the inhabitants of Birmingham and district, and a most brilliant gathering assembled in the gardens, which were tastefully illuminated with thousands of variegated lamps and lanterns. When darkness fell a grand display of fireworks was given under the management of Messrs. Brock & Co. A device which excited much amusement depicted an old alchemist surrounded by the paraphernalia of his art, which were scattered by the explosion of his retort.

Music was provided in the bandstand by Gilmer's military band, and at the conclusion of the fireworks dancing was commenced in one of the buildings of the gardens and kept up until a late hour of the evening.

Thursday's Excursion.

At 9.30 a party of about 300 took train from Snow Hill Station to Worcester, arriving about 10.30. Here the party divided and visited, in turn, the Royal Porcelain Works, the Commandery, and the Cathedral. All three proved exceedingly interesting and were much enjoyed. Luncheon was provided at the Guildhall at 1.15, after which the Mayor of Worcester (Mr. H. A. Leicester, J.P.) gave a cordial address of welcome to the Conference. At 2.45 a special train conveyed the party to Malvern where carriages were awaiting them. Then followed a most enjoyable drive, in perfect weather, through Malvern to the old British Camp, where a halt was made for refreshments and to enable the visitors to explore the hills and surrounding country. The drive was then resumed and a return made to Malvern viâ North and West Malvern. At the Imperial Hotel high tea was served, and after some music on the lawn the return to Birmingham was made by special train. All the arrangements were carried out in a manner reflecting the highest credit on the organizing capacity of the Birmingham Local Committee.

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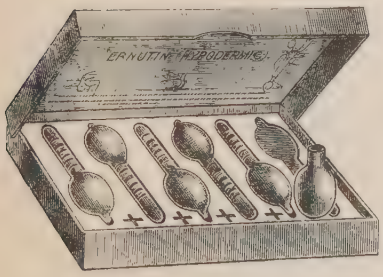

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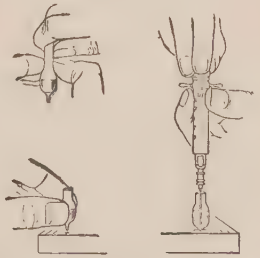

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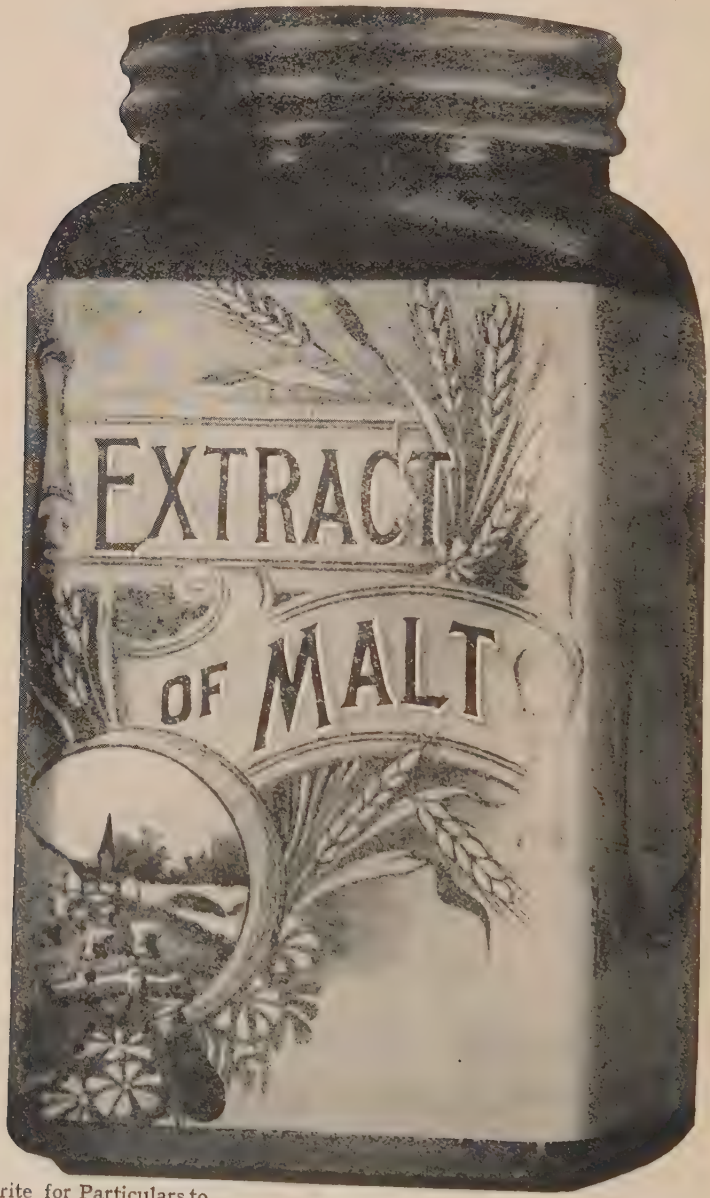

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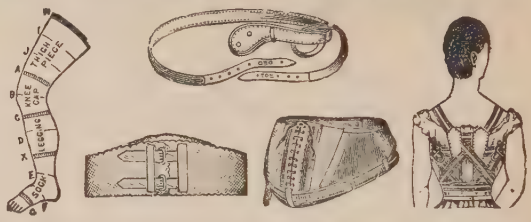

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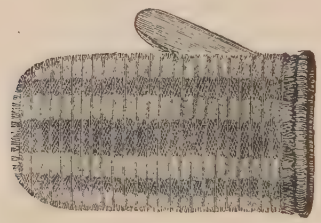

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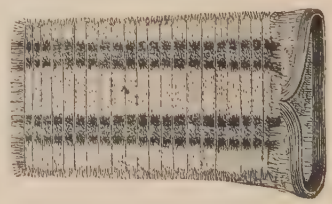

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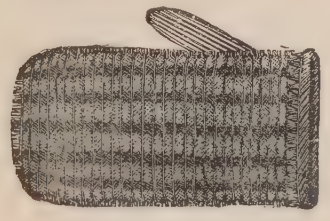

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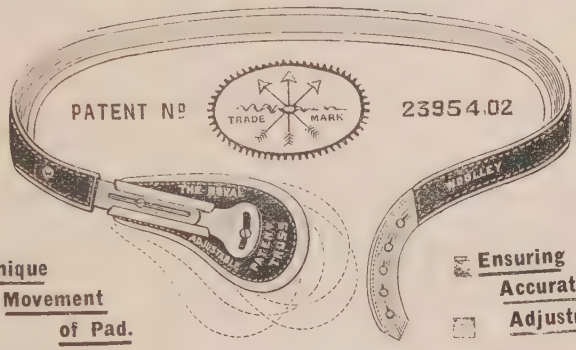

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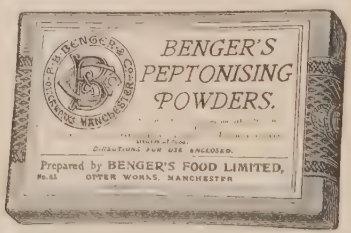

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